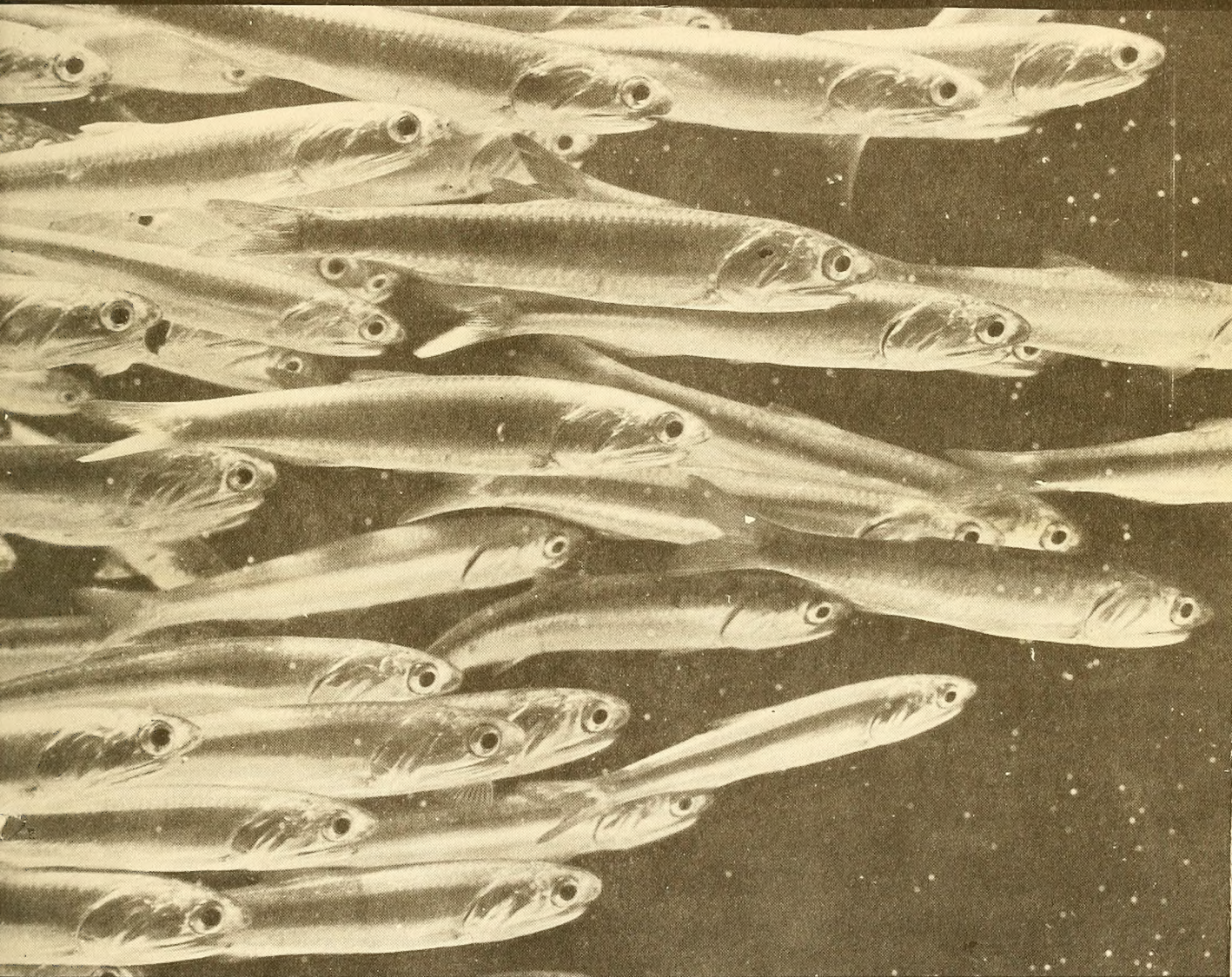






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COMMERCIAL FISHERIES REVIEW



VOL. 28, NO. 1

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COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
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5/31, 68

CONTENTS

COVER: California school of northern anchovies (*Engraulis mordax*). The possible reopening of a limited commercial fishery for anchovy off California has stirred wide interest. Over the years, there have been dramatic changes in the sardine, mackerel, and anchovy resources of the California Current. The evaluation and management of those interrelated stocks has been greatly aided by the studies of the Fishery-Oceanographic Center at La Jolla, Calif. That research complex--including marine laboratories of Federal, State, and private agencies--has helped make southern California one of the leading fishery research areas in the United States.

Page

- 1 . . New Approaches to Quality Changes in Fresh Chilled Halibut, by Max Patashnik
- 8 . . Wade Seine Construction and Method of Use, by Hilton M. Floyd

Page

TRENDS AND DEVELOPMENTS:

- 12 . . Technical Note No. 2--An Inexpensive Scallop Cleaner Built from Spare Parts, by Austin B. Williams
- Alaska:
- 14 . . Foreign Fishing Activity off Alaska, October 1965
- 15 . . Japanese Catches on Albatross Bank Excellent
- 15 . . Larger Shrimp Processed at Homer Plant
- 15 . . Processing Plant for Bottomfish Planned at Kodiak
- 15 . . New King Crab-Processing Plant at Kodiak
- Alaska Fisheries Investigations:
- 16 . . Sculpin Feed Heavily on Pink Salmon Eggs
- American Fisheries Advisory Committee:
- 16 . . Recommendations at Meeting in California
- American Samoa:
- 16 . . Tuna Fishing Fleet

Page

TRENDS AND DEVELOPMENTS (Contd.): California:

- 16 . . Albacore Tuna Migration Studies
- 17 . . California Halibut Tagging and Related Studies
- 17 . . Rockfish Species Collected for Biological Studies
- 18 . . Fall 1965 Pelagic Fish Population Survey
- 21 . . Marine Life Explorations off Santa Catalina Island
- 22 . . Marine Sport Fish Survey off Southern California
- 22 . . Sea Otter Population Survey
- 22 . . Anchovy Fishing Proposals Reset for Consideration by State Fish and Game Commission
- 23 . . Employment Opportunities for Biologists With California Department of Fish and Game

Contents continued page II.

CONTENTS (CONTINUED)

Page		Page	
	TRENDS AND DEVELOPMENTS (Contd.):		TRENDS AND DEVELOPMENT (Contd.):
23 ..	Cans--Shipments for Fishery Products, January-August 1965		North Atlantic:
	Caribbean and Tropical Atlantic Fisheries Explorations:	40 ..	Soviet Fishing Activity off Coast, November 1965
23 ..	Trawling Explorations in Southern Caribbean		North Atlantic Fisheries Investigations:
	Central Pacific Fisheries Investigations:	41 ..	Lobster and Sea Herring Population Studies Continued
25 ..	Function of Dark and Light Muscle in Tuna Studied	42 ..	Fall Distribution of Larval Herring in Gulf of Maine Studied
26 ..	Marine Life Behavior and Related Biological Observations		North Pacific Fisheries Explorations and Gear Development:
27 ..	Submarine Tested in Underwater Research Education:	42 ..	Modified Pelagic Trawls Tested
28 ..	"Sea-Grant" Colleges Recommended by National Conference at University of Rhode Island		Oceanography:
	Federal Purchases of Fishery Products:	44 ..	Research Vessel <u>John Elliot Pillsbury</u> Completes 8-Month Expedition
29 ..	Defense Department Revises Inspection Criteria for Food Establishments	45 ..	New U. S. Research Vessel Ready for Delivery Oregon:
29 ..	Defense Department Revises Subsistence Contractor Inspection Procedures Manual	45 ..	Willamette River Spring Chinook Salmon Returns for 1965
	Fisheries Laboratory:	46 ..	Surplus Silver Salmon from Coastal Hatcheries Used to Seed Other Waters
29 ..	New Game Fish Research Laboratory for Texas Gulf Coast		Salmon:
	Fur Seals:	46 ..	U. S. Pacific Coast Canned Stocks, November 1, 1965, and New Season Pack
29 ..	Interior Department to Issue New Proposals for Processing Alaska Skins		Shrimp:
30 ..	Prices for Alaska Skins at Fall 1965 Auction	47 ..	Breaded Production, July-September 1965
	Great Lakes:		United States Fisheries:
31 ..	Public Hearing Held on Proposed Changes in Michigan's Yellow Perch Fishing Regulations	48 ..	Fish Sticks and Portions, July-September 1965
31 ..	Michigan Postpones Plan to Introduce Striped Bass	48 ..	National Anadromous Fishery Program Act
32 ..	Michigan Streams Selected for First Silver Salmon Plantings		U. S. Fishing Vessels:
	Great Lakes Fisheries Explorations and Gear Development	49 ..	Documentations Issued and Cancelled, July 1965
33 ..	Lake Superior Trawling Studies Continued		U. S. Foreign Trade:
	Great Lakes Fishery Investigations:	49 ..	Imports of Canned Tuna in Brine Under Quota
35 ..	Biological Research and Sea Lamprey Control, October 1965	49 ..	Trends in United States Exports of Fishery Products, 1964
	Gulf Fisheries Explorations and Gear Development:		Virginia:
35 ..	Shrimp Gear Studies Continued	51 ..	Catch Forecasts for Major Fisheries in 1966
	Gulf Fishery Investigations:		Washington:
36 ..	Shrimp Distribution Studies	52 ..	Record Salmon Releases from Hatcheries in January-June 1965
	Gulf States:	52 ..	Test Fishing for Hake in Puget Sound
36 ..	Fishery Landings, 1964		Wholesale Prices:
	Hawaii:	53 ..	Edible Fish and Shellfish, November 1965
37 ..	Fishery Landings, 1964		FOREIGN:
	Industrial Fishery Products:		International:
37 ..	U. S. Fish Meal and Solubles:		Food and Agriculture Organization:
	Production and Imports, January-September 1965	55 ..	World Fish Catch Tops 50 Million Tons in 1964
37 ..	U. S. Fish Meal, Oil, and Solubles:	58 ..	Eastern Hemisphere Countries Send Delegates to FAO-U.S.S.R. Study Tour on Fisheries Training
	Production, September 1965		Fish Meal:
	Inland Fisheries Explorations and Gear and Development:	59 ..	World Production, August 1965
38 ..	Oahe Reservoir Trawling Studies	59 ..	Production and Exports for Selected Countries, January-August 1965
	Inventions:		International North Pacific Fisheries Commission:
39 ..	New Fishery Processing Methods Patented	60 ..	12th Annual Meeting
39 ..	New Fishing Tackle Device Patented		International Council for the Exploration of the Sea:
	Marketing:	61 ..	53rd Statutory Meeting in Rome
39 ..	Edible Fishery Products, January-August 1965 and Outlook for 1966		International Labor Organization:
		62 ..	Meeting on Conditions of Work in the Fishing Industry

Contents continued page III.

CONTENTS (CONTINUED)

Page		Page	
	FOREIGN (Contd.):		FOREIGN (Contd.):
	International (Contd.):		Honduras:
	North America:	75 ..	Shrimp Landings Down in 1965
64 ..	Share of World Fish Catch Drops in 1964		Iceland:
	Nordic Countries:	75 ..	Export Stocks of Principal Fishery Products, September 30, 1965
65 ..	New Fishing Limits Recommended		Ireland:
	Salmon:	76 ..	Fish Meal Industry Expansion Trends
65 ..	Pacific Fisheries Discussed at United States-Canadian Meeting		Ivory Coast:
	International Pacific Salmon Fisheries Commission:	76 ..	Fishery Trends, January-June 1965
65 ..	Annual Meeting Announced		Japan:
	Australia:	76 ..	Frozen Tuna Exports to U. S. and Puerto Rico, July-September 1965
66 ..	Spiny Lobster Production Drops in FY 1964/65	77 ..	Export Validations of Fresh and Frozen Tuna and Tuna Loins, April-September 1965
66 ..	Shrimp Fishery Trends, Fiscal Year 1964/65	77 ..	Frozen Albacore Tuna Price for Export to U. S. from Japan Proper
67 ..	Results of Shrimp Survey off New Guinea	77 ..	Atlantic Tuna Market and Fishing Trends
	Canada:	78 ..	Canned Tuna in Brine Sales to U.S.
68 ..	British Columbia Herring Fishery Labor Negotiations	78 ..	Industry Official's View on U. S. Tuna Tour
68 ..	Nova Scotia Lobster Fishermen Receive Government Aid for Storm Damage	79 ..	Tuna Purse-Seining to be Tried Near Guam
68 ..	New Chart of Fishing Banks Southeast of Nova Scotia	79 ..	Government Takes Dim View of Industry's Tuna Fishery Rationalization Proposals
69 ..	New Fish-Processing Plant to be Built in Shippigan, New Brunswick	80 ..	Crab Meat Exports, September 1965
69 ..	Newfoundland Fisheries Aided by New Bait-Holding Units	80 ..	Canned Shrimp Exports, September 1965
69 ..	Newfoundland Seeks Japanese Help to Develop Offshore Fishery	80 ..	Export Prices of Canned Sardine and Mackerel Raised
69 ..	Conference on Atlantic Offshore Fishing Vessels	80 ..	Frozen Swordfish Export Validations to the U. S. and Canada, April-September 1965
70 ..	Fisheries Trade Mission Visited Italy, Spain, and Portugal	81 ..	Exports of Frozen Rainbow Trout, September 1965
	Chile:	81 ..	Exports of Frozen Fishery Products Other Than Tuna, April-September 1965
70 ..	Fishery Trends, Third Quarter 1965	81 ..	Poor 1965 Sauri Season Forecast
	Cuba:	82 ..	Bering Sea Fishing Trends
71 ..	Trawlers and Tuna Vessels Ordered from Spain	82 ..	Views on North Pacific Whale Stocks
	Republic of Dahomey:	83 ..	North Pacific Sperm Whale Study
71 ..	Government Forbids Trawling Within 12-Mile Fishing Limits by Unlicensed Foreign Vessels	84 ..	Antarctic Whaling Operations and Outlook for 1965/66 Season
	Denmark:	84 ..	Pollock to be Imported from U.S.S.R.
71 ..	Fishery Trends, January-September 1965	85 ..	Japan-Communist China Fishery Agreement to be Renegotiated
	Faroe Islands:	85 ..	Government to Compensate Fishermen for Vessels Seized by South Korea
72 ..	British Quota on Faroese Landings Liberalized	85 ..	Report on Overseas Fishery Investments
	France:	86 ..	Scientists See Need to Re-Examine Distant-Water Fisheries Policy
73 ..	Promotional Campaign Urges Increased Fish Consumption	86 ..	Vessel Management and Operation Trends, FY 1964
73 ..	Fisheries Exposition Planned in Lorient, May 12-22, 1966	87 ..	One-Percent Tax on Exports to Nigeria
	German Federal Republic:	87 ..	Radar-Buoy for Tracking Fishing Gear at Sea
73 ..	Fish Meal Market at Hamburg, October 26, 1965	87 ..	Fish-Finder for Trawl Gear Developed
73 ..	Two New Factory Trawlers Delivered		Republic of Korea:
	East Germany:	88 ..	Tuna Fleet Expansion Causes Concern in Japan
74 ..	Deep-Sea Submarine Operated by Remote Control Developed	88 ..	Tuna Vessels Imported from Japan
	Greece:		Mexico:
74 ..	Freezer-Trawler Fishery Trends, January-July 1965	88 ..	Shrimp Fishery Trends, January-September 1965
74 ..	Shrimp Fishing in Persian Gulf		Mozambique:
	Greenland:	89 ..	Shrimp Fishery off Coast Shows Promise
75 ..	Salmon Fishery Trends, October 1965		Pakistan:
		89 ..	Status of Frozen Foods Industry Under Second Five Year Plan

Contents continued page IV.

CONTENTS (CONTINUED)

Page		Page	
	FOREIGN (Contd.):		FOREIGN (Contd.):
	Peru:		United Arab Republic (Contd.):
90 ..	Fish Meal Production and Export Forecast for 1965	98 ..	Foreign Trade in Fishery Products, 1964
90 ..	Fish Meal Industry--Short- and Long-Term Outlook		United Kingdom:
	Poland:	98 ..	Sales Companies in United States Formed by British Food Firm
91 ..	Northwest Atlantic Fishery Trends, July-August 1965	98 ..	Firm Contracts for Soviet Canned Salmon and Crab Meat
91 ..	Landings and Fishery Trends, January-June 1965	98 ..	Fishery Loan Interest Rates Revised
92 ..	Fishing Vessels May be Ordered from Denmark and East Germany	99 ..	New Trawlers from Old Hulls
	Portugal:	99 ..	Yugoslavia:
93 ..	Tuna Fishery Trends, 1961-64		New Tuna Vessels Outfitted for Atlantic Fishing
	South Africa Republic:		FEDERAL ACTIONS:
94 ..	Pelagic Shoal Fish Catch, January-July 1965	100 ..	Federal Committee on Pest Control:
	U.S.S.R.:		Pesticide Monitoring Program Approved
94 ..	Shrimp Fishing Activity in Gulf of Alaska Increased		General Services Administration:
95 ..	Deep-Water Trawling in Barents Sea		Federal Supply Service:
95 ..	Trawling Fleet off South-West Africa in July 1965	101 ..	New Federal Specifications for Canned Sardines, Canned Shrimp, and Canned Tuna
95 ..	Offshore Fishing Fleet Status, May 1965		Department of the Interior:
95 ..	Pair Fishing Increases Herring Catches in 1964		Fish and Wildlife Service:
95 ..	Exploratory Fishery Expedition to Eastern Pacific	101 ..	Bureau of Commercial Fisheries:
95 ..	Soviet Fishing with Lights and Electricity to be Expanded		Applications for Fishing Vessel Loans
	United Arab Republic:	102 ..	Hearing on Application for Fishing Vessel Construction Differential Subsidy
96 ..	Fishery Trends, 1965	102 ..	Eighty-Ninth Congress (First Session)
			RECENT FISHERY PUBLICATIONS:
		103 ..	Fish and Wildlife Service Publications
		105 ..	Miscellaneous Publications



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NEW APPROACHES TO QUALITY CHANGES IN FRESH CHILLED HALIBUT

By Max Patashnik*

ABSTRACT

Results of some new and simplified objective methods for measuring quality differences in iced halibut were compared with subjective or sensory methods. In this interim report to industry, the potential applicability of some of these results to industry practice is discussed. The quality aspects considered are freshness, raw-meat elasticity, cooked texture, and the abnormal chalky condition.

INTRODUCTION

Few data exist on the relation between the degree of freshness of halibut to its retention of quality during frozen storage. This information is needed to develop meaningful criteria for grading fresh halibut as landed, especially since halibut before final consumption may be held in ice for over 3 weeks prior to dockside delivery and may be additionally held in frozen storage for 1 to 2 years. To define the initial quality of the landed fresh halibut in subjective and objective terms and to relate it to the time-temperature rate of change in quality of the frozen product were the main purposes of this study. This is an interim report mainly concerned with the general aspects of the first objective.

From a practical and a laboratory standpoint, we need simple, rapid tests for both measuring and confirming quality differences in halibut of varying lengths of time out of water--tests that do not involve judgment or bias. Such tests must be both practical and useful to government and industry inspectors who are asked to spot check random lots of halibut. The tests are intended for application to a representative sample of a given lot rather than to each halibut unloaded. Also, the tests should involve new concepts and new approaches--with an eye to future needs.

In this report, I plan to discuss very briefly some highlights of our current work and to indicate, where possible, the potential practical aspects of this work. The discussion will be limited to the evaluation of the following four aspects of halibut^{1/} quality: (1) freshness, (2) raw-meat elasticity, (3) texture of the cooked meat, and (4) abnormal chalky condition.

To avoid any misunderstanding, I wish to emphasize that I am reporting preliminary tests that have not as yet been statistically evaluated. Hence, before any of these potential tests can be recommended for acceptance, they will require further study.

FRESHNESS

In evaluating freshness, I felt that it would be more practical to favor methods that are simple, rapid, and different in conceptual approach. Thus, some chemical and physical meth-

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^{1/}Talk delivered at Bureau of Commercial Fisheries Pacific Northwest Regional Conference on Fresh Dressed Halibut Quality and Standards on February 18, 1965, Seattle, Wash.

^{2/}The halibut in this study were caught off the Washington coast, about 20-40 miles southwest of Cape Flattery in 90 fathoms of water, with a locally chartered halibut vessel.

ods along with our usual sensory procedures were simultaneously used. Briefly and without detailed explanation, the following results are given--again with the understanding that further work is still needed.

CHEMICAL METHODS: The two chemical criteria employed--(1) hypoxanthine, a post-mortem breakdown product that develops from adenosine triphosphate (ATP, a compound involved in muscle action in the live fish), and (2) magnesium (also involved in ATP muscle action)--both change during the postmortem period with the degradation of cellular muscle tissue and biochemical constituents.

Hypoxanthine: The increase in hypoxanthine (by the method of Spinelli, Eklund, and Miyauchi 1964) in the halibut nape with increase of days in ice is shown in figure 1. At about the 19th day, our taste panel rejected the halibut because of off-flavor; this corresponds to about 0.28 mg. hypoxanthine per gram of meat. Hypoxanthine values below 0.15 therefore indicate a high level of freshness. Provisionally, we may consider Grade 1 halibut as having values below 0.21 and Grade 2, values between 0.21 and 0.27.

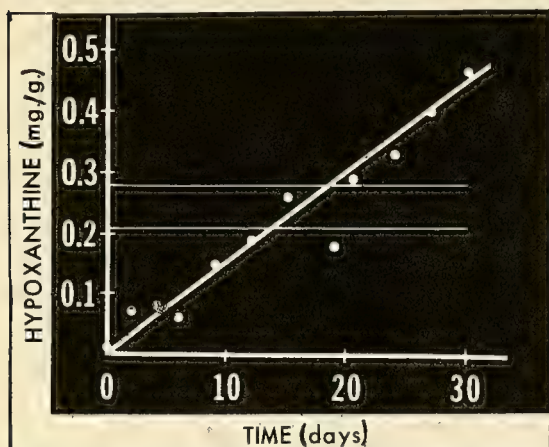


Fig. 1 - Variation in hypoxanthine content of halibut nape during iced storage.

Magnesium: The decrease of magnesium (by a modified method of Orange and Rhein 1951) in the free drip (24-hour drip at 33° F.) is shown in figure 2. At about the 19th day, our taste panel rejected the halibut because of off-flavor; this corresponds to 14-15 mg. percent magnesium. (We reject at a flavor score of 5 on a 0 to 10 sensory scale.) Magnesium values above 18 to 20 mg. percent indicate a high level of freshness.

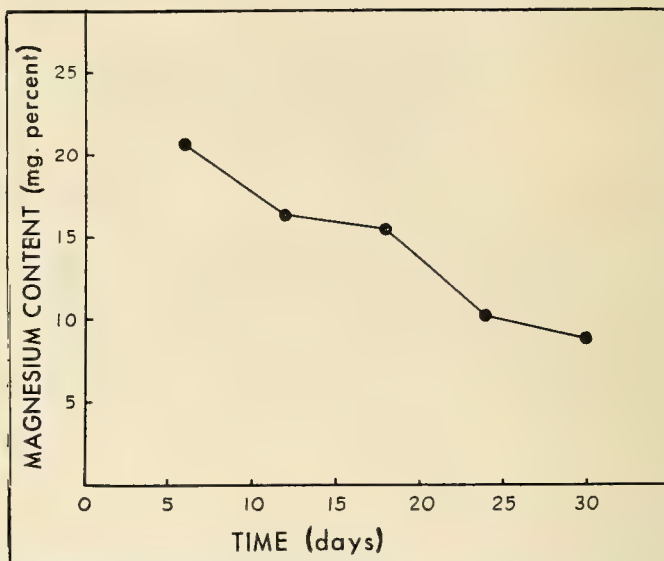


Fig. 2 - Magnesium content of the free drip of iced halibut (24-hour drip at 33° F., nape meat.)

These two chemical indices show initial promise but will have to be tested further on other series of halibut.

PHYSICAL METHODS: Physical methods, because of their inherent simplicity, offer the possibility for rapid examination of large numbers of samples. Two such methods were employed in this study: (1) pH difference between the skin surface and interior meat and (2) the electronic fish tester (Model V, developed in Germany).

pH difference: The pH measurements are made by setting the electrode in contact with the fish-skin surface and then with the interior meat. Values are read on the expanded scale of the pH meter after equilibration of the pH, usually within a couple of minutes. The pH difference between the skin surface and interior meat is a measure of the relative change in acidity due to bacteriological activity on the surface. Figure 3 shows little pH difference (about 0.2) until about the 10th or 12th day of iced storage, after which the rate of change in-

creases sharply. At about the 19th day, the halibut becomes unacceptable to a taste panel at which time we note a fivefold increase in the pH difference. Although evidence of panel rejection appeared on the 19th day, we still found some acceptable fish in the 24-day fish. The estimated possible quality range values could be: Grade 1 halibut below 0.6 and Grade 2 between 0.6 and 0.9.

Electronic Fish Tester: The electronic fish tester was tried with fair success at our laboratory on several species of bottomfish. The main advantages of this instrument are its simplicity of use, its portability, and its speed of operation. About 2 to 3 halibut per minute can readily be evaluated, making practical the field examination of a large number of samples.

PRINCIPLE OF TEST: After a fish dies, electrophysiological changes occur. This instrument is supposed to measure the difference in resistance of the cell membranes of a fish to two alternating currents (sent through electrodes applied to the fish surface)--one at a low frequency and one at a high frequency. The freshness is measured as follows: $Q = \frac{(R_L - R_H)}{R_H} 100$, where Q = freshness reading on instrument, and R_L and R_H

are the resistances at low and high frequencies, respectively. In a fresh fish (with the cell membranes intact), there is a large difference in resistance between the low and high frequencies, so instrument Q values are high. However, as the fish ages, the cell membranes of the fish begin to break down; they increase their permeability to charge-carrying ions, which reduce their resistance and capacitance, such that now the difference in resistance at the low and high frequencies decrease, and eventually disappear. Instrument Q values are low (Hennings 1963).

RESULTS WITH HALIBUT: In figure 4, we see that the instrument readings decrease very rapidly during the first 4 days of storage but decrease more gradually during subsequent storage, down to zero and below on some halibut.

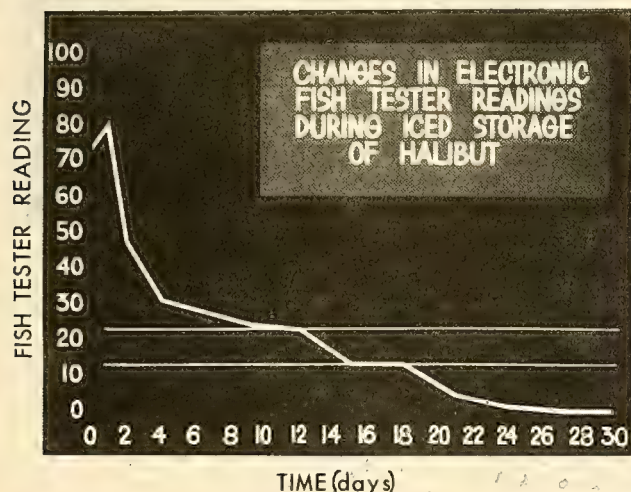


Fig. 4 - Variation in fish-tester readings during iced storage of halibut in a 38° F. chill room.

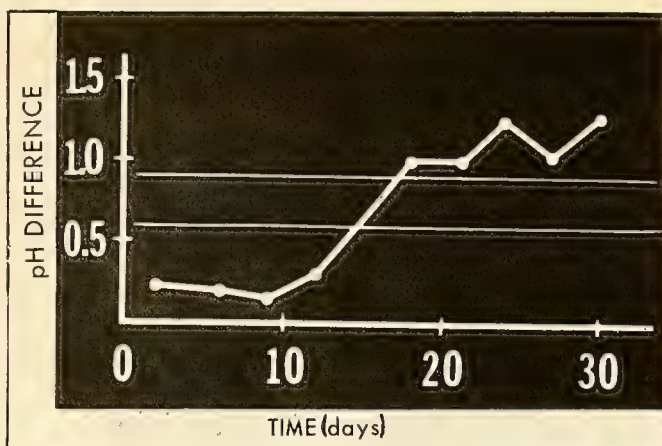


Fig. 3 - Difference in pH between halibut skin surface and interior meat at nape during iced storage in a 38° F. chill room.

Looking at figure 4, we might consider 0 to 4 days as being a rapid cellular breakdown phase, 4 to 12 days as being an equilibration phase for diffusion of cellular constituents and gradual bacterial buildup, and 12 to 24 days as being the period of accelerated microbial action (this agrees with the pH data in fig. 3) and further cellular breakdown. The halibut becomes unacceptable to the taste panel on about the 19th day, at a fish-tester reading of about 12. Fish-tester readings above 25 indicate a high level of freshness. Therefore, it would appear that values above a reading of about 20 could be considered for Grade 1, and between about 15 to 20 for Grade 2. Of course, more work will have to be done to confirm these limits on a statistical basis before they can be recommended to industry.

APPLICABILITY TO HALIBUT: Although the fish tester gives a fairly good estimate of the freshness or quality of a lot of fish, it will give abnormally low values for individual fish if: (a) the skin has been bruised or damaged at the point measured, (b) the fish has been partially or completely frozen, or (c) the fish has been subjected to excessive pressures or stresses. Since halibut is a rather large fish, the possibility of bruising and surface abrasion during normal handling presents a problem. However, if the sampling size is sufficiently large, which is practical since 2 to 3 halibut per minute can readily be evaluated, it appears that the bruising factor does not introduce serious variability in the instrument determinations of the halibut freshness on a lot basis. Also, in spite of the wide variability in halibut thickness, instrument readings appear to be independent of this factor within a given halibut. In summary, we can say that our data on halibut freshness looks promising enough to warrant further evaluation of this type of instrumental measurement on halibut.

ELASTICITY STUDIES

The relative subjective elasticity and softness of the raw meat of the landed fresh halibut is presently employed in dockside grading of halibut. We were therefore interested in its relation to textural quality of the cooked meat, initially and after frozen storage.

INSTRUMENTAL MEASUREMENT: The instrument we used to measure halibut softness or elasticity objectively is illustrated in figure 5. To estimate the elasticity subjectively, we press our finger into the halibut meat (fig. 5a) and then evaluate the rate and amount of recovery from the depression (fig. 5b) as a measure of the elasticity. To duplicate this action with the instrument, we apply a 1-pound weight to the fish surface through a round plastic knob for 10 seconds and read the total depth of depression on a dial; we then remove the weight, allow the depression to recover for 10 seconds, and read the depth of the remaining depression of the dial. The remaining depression after recovery, expressed as a percentage of the depression caused by the 1-pound weight, is the percentage residual deformation or percentage loss of elasticity.

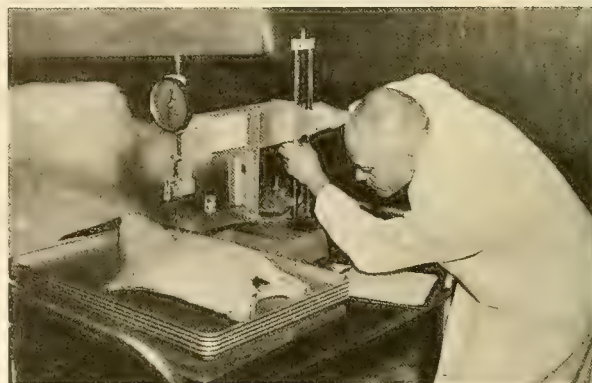


Fig. 5 - Measuring the elasticity of halibut.



Fig. 5a - Pressing finger into halibut meat to estimate softness and elasticity.



Fig. 5b - Showing residual deformation in soft halibut with poor elasticity.

RESULTS: In figure 6, the curve indicates the increasing percentage loss in elasticity (percentage residual deformation, fig. 5b) with days in ice. Now, if we cook samples from these halibut before we freeze the halibut or after 1 year of storage of the frozen halibut at -20° F. and evaluate the cooked texture with a taste panel or our hydraulic shear instrument (Dassow, McKee, and Nelson 1962), we find little, if any, noticeable difference.

Provisionally, we may say that soft halibut or halibut of poor elasticity do not necessarily result in poor cooked textural quality, either immediately after freezing or after 1 year of

storage at -20°F . (The effect of 0°F . storage on the rate of degradation in cooked texture is under study.) We should, however, point out that if our iced storage conditions are improved, we get a less steeply rising curve than that shown in figure 6--that is, we get a lower rate of loss of elasticity. Under these latter circumstances, although the texture characteristics do not show any real difference again, the product quality is increased from a freshness standpoint (sensory flavor evaluation).

TEXTURE STUDIES

We often find wide variability in cooked halibut texture within a given halibut and between halibut of similar origin. The wide variability of texture often observed cannot be directly related to days of iced storage. However, if we examine some of our data in terms of pH, we find an interesting correlation.

Figure 7 shows a comparison of the hydraulic shear or toughness of the frozen cooked halibut against the pH of the cooked drip for some 2- and 15-day iced halibut. (The hydraulic shear is obtained by cooking a frozen cylinder of halibut, placing the cooked plug between the set of jaws of the hydraulic shear instrument (Dassow, McKee, and Nelson 1962), and shearing to failure. The maximum hydraulic shear force represents the textural resistance or toughness of the halibut.)

Figure 7 also indicates that halibut of low pH are almost twice as tough as halibut of high pH, regardless of whether they are 2 days or 15 days old. We may conclude that the pH of the landed fish is of greater significance in determining the textural characteristics of the cooked product than the age of the landed halibut. The pH we know is related to the methods of catching and the degree of struggle of the halibut prior to death. This pH relation points to the importance of immediate stunning of halibut (not part of current vessel practice) in order to limit the degree of struggle.

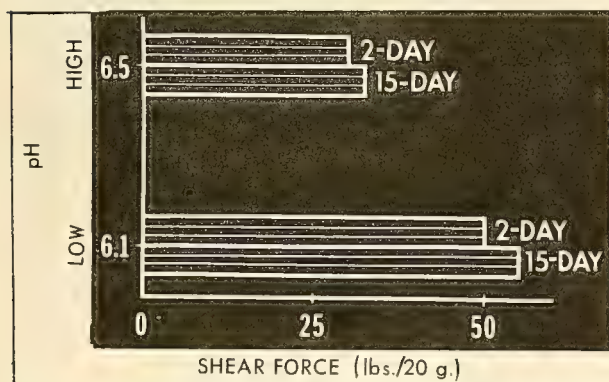


Fig. 7 - Comparison of hydraulic shear (toughness) of frozen cooked halibut against pH of the cooked drip for 2- and 15-day iced halibut after 1-year storage at -20°F .

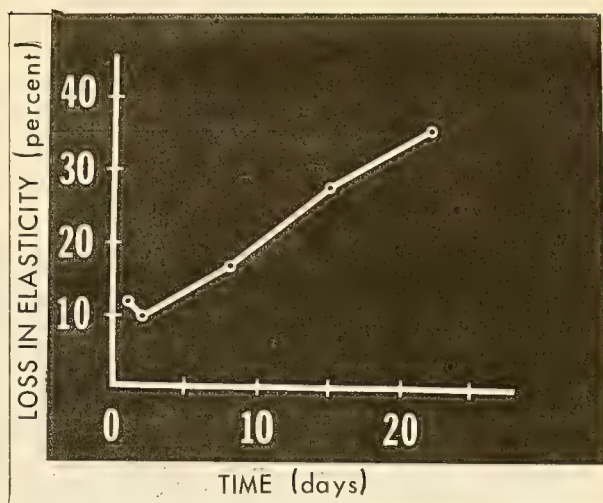


Fig. 6 - Loss of elasticity of halibut during iced storage in 40°F to 60°F . chill room.

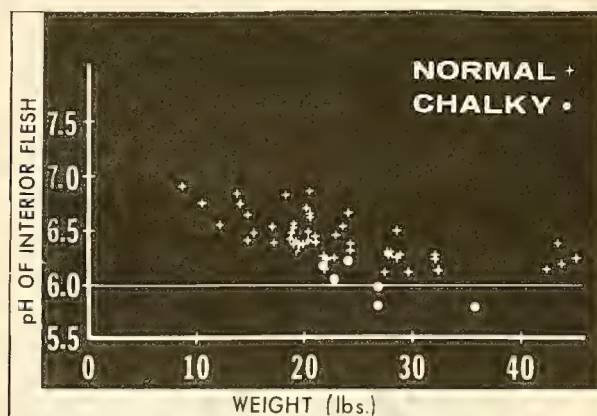


Fig. 8 - Variation of interior meat pH with weight of the halibut, head on and eviscerated.

At this point, I would like to present some data relating the pH of the interior meat to the size of the halibut. Figure 8 shows that the pH decreases with increasing weight of the halibut up to about 30 pounds and remains fairly constant above that weight. Of the six chalky halibut (discussion in next section) found in this experimental lot of halibut, the three severely chalky halibut were below pH 6.0, and the three slightly chalky halibut were above pH 6.0.

In evaluating the texture of these chalky halibut, we found that hydraulic shear (toughness) values were in about the 60-70 pounds force range, as we would expect from their low pH.

CHALKY CONDITION

The industry continues to be concerned about the chalky condition from both a quality and an economic standpoint. The precise cause and control of the condition is not completely known. The condition varies in degree from barely perceptible to excessive.

OBSERVATIONS: The condition is not immediately apparent but develops within at least 2 days after the halibut are caught. In normal halibut, the meat is semitranslucent; whereas

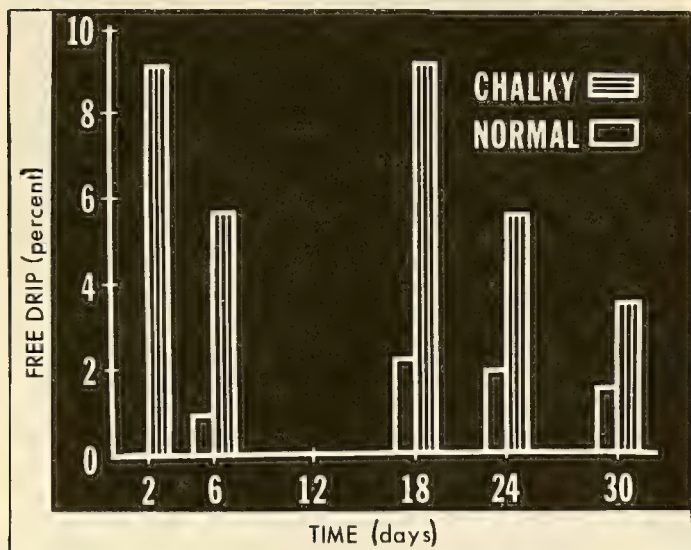


Fig. 9 - A comparison of the free drip from chalky and normal halibut during iced storage at 38° F. (Note: No measurable free drip was formed in the normal 2-day halibut.)

in chalky halibut, it takes on a flat-chalky-white opaque color. Other main abnormal characteristics of chalky halibut are its low pH and its great tendency to lose water (the water literally flows out of the tissue when it is cut). Its ready tendency to lose water is illustrated in figure 9 for the 2- to 30-day iced halibut.

In examining chalky halibut, we find a lower protein solubility (in high- and low-ionic-strength extractions) and a lower protein content in the free and cooked drip than are found in normal halibut. The cooked meat of chalky halibut becomes dry and tough but is otherwise acceptable. No identifiable parasites have been found associated with this condition.

EXPLANATION OF CHALKY CONDITION:

Based on our tests, on studies of meat products, and on studies in Canada at the Vancouver Technological Laboratory (Tomlinson, Geiger, and Dollinger 1964), it appears that the predisposition to the

chalky condition involves (1) feeding halibut that have high glycogen energy reserves in the muscle, (2) halibut that die in a frenzy of activity or are extremely exhausted, causing an accumulation of fatigue-produced lactic acid in the muscle, (3) halibut that are, for one reason or another, unable to get rid of the relatively high lactic acid accumulation, and (4) halibut held at a relatively high temperature--the higher the temperature of holding, the more rapidly the condition develops. The muscle proteins under these conditions appear to be sufficiently injured or altered to give rise to the readily apparent abnormality. This represents a preliminary working hypothesis subject to further test evaluation and modification.

The condition observed is similar to that found in "watery meat" or so-called "muscle degeneration." This condition may be "found in nearly every case when rigor is allowed to occur rapidly at a relatively high temperature, whether in the rabbit, pig, beef, or whale" (Bendall 1963). A well-fed animal killed under severe physical struggle or stress conditions is more subject to this condition than one killed without struggle.

APPLICABILITY OF INFORMATION ON CHALKY HALIBUT: Provisionally, the following practice for minimizing the chalky condition may be recommended:

At Fishermen's Level: (1) Kill or stun halibut immediately to stop all physical activity. (Physical activity may increase the tendency toward chalky condition, and it may also lower the pH sufficiently to affect the texture of the meat adversely.) (2) Chill halibut immediately, as holding the fish at higher deck temperatures favors the earlier development of the chalky condition.

At Processors' Level: In fletching operations, avoid the use of halibut that may be potentially chalky as evident by trial examination of a meat cut or by pH measurement. Freeze these segregated halibut immediately and handle and use them only frozen. (Thawing for later use results in an intensification of the condition.)

SUMMARY

The principal aim of this study was to define the initial quality of fresh halibut when landed in subjective and objective terms. The need for simple rapid objective quality tests was simultaneously considered in the evaluation of the quality attributes: freshness, raw-fish elasticity, cooked texture, and abnormal chalky condition.

The chemical criteria for freshness (hypoxanthine content of meat and magnesium content of drip) and the physical criteria for freshness (difference in pH between surface and interior meat and surface measurement by electronic fish tester) all show promise but will require further testing. The use of the electronic fish tester appears to be the most practical because of its speed and operational simplicity.

The loss in elasticity of halibut during iced storage did not cause a related loss in cooked textural quality, immediately after freezing, or after 1-year of storage at -20°F .

The variability in cooked halibut texture was more directly related to the pH of the landed halibut than to the days of storage on ice--the lower the pH, the poorer the texture.

The main adverse characteristics of the abnormal chalky condition (white-opaque meat color) in halibut involved a lower than normal pH, poor water retentivity of the raw and cooked meat, and an associated poor texture. A preliminary hypothesis for this condition was set forth.

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Note: Acknowledgment: R. Nelson (Chemical Engineer, U. S. Bureau of Commercial Fisheries Technological Laboratory, Seattle, Wash.) procured the halibut used in this study. R. Nelson and Harold Barnett (Chemist, Bureau of Commercial Fisheries Technological Laboratory, Seattle, Wash.) obtained the electronic-fish-tester and hypoxanthine data.



Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.

WADE SEINE CONSTRUCTION AND METHOD OF USE

By Hilton M. Floyd*

The wade seine is one of the many and varied types of haul seines used in the fishing industry. Since the fishermen have to wade into the water with this seine, it is used mostly in warm climates. The seine described in this paper is popular along the southeastern coast of the United States, especially in northeastern Florida. Species caught on the Florida coast with the wade seine include mullet (Mugil sp.), spotted or speckled sea trout (Cynoscion nebulosus), king whiting or kingfish (Menticirrhus americanus), white sea trout or weakfish (Cynoscion arenarius), fluke or summer flounder (Paralichthys lethostigma), bluefish (Pomatomus saltatrix), and gafftopsail catfish (Bagre marinus).

The wade seine is one of the easiest seines to construct because it has no tapered netting. Actually it is just a rectangular piece of netting with a floatline, a leadline, and a pole attached to each end for convenience in hauling.

Purchasing a ready-made seine usually saves valuable time; however, some commercial fishermen might save money by building this gear themselves.

This paper will first describe the gear and then tell how it is used.

CONSTRUCTION

Species to be caught and laws governing mesh size and net dimensions are many and varied, so it would be impracticable to describe a "universal" seine--one suitable for all areas of the world. However, a 180-foot-long, $2\frac{1}{2}$ -inch stretched mesh seine has proven successful along the southeastern coast of the United States and will be used as the example in this paper.

Synthetic materials are recommended because they are strong and lasting. Materials needed to construct a wade seine can be obtained at most supply houses serving commercial fishermen. Materials needed:

1. Netting--double selvage, 1,440 meshes long (300 feet stretched) and 50 meshes deep. Mesh size-- $2\frac{1}{2}$ inches (stretch measure) of No. 208 nylon twine. No. 208 twine is about 0.0224 of an inch in diameter.
2. Floatline and breastlines-- $\frac{1}{4}$ -inch diameter hard-laid nylon rope, 207 feet long.
3. Leadline-- $\frac{5}{16}$ -inch diameter braided leadcore rope (50 pounds per 600 feet), 193 feet long.
4. Net floats (60)-- $2\frac{1}{2}$ inches diameter by $1\frac{1}{2}$ inch thick by $\frac{1}{2}$ -inch hole, made of synthetic or cork material.
5. Hanging-in twine--No. 9 spun nylon, 1 pound. No. 9 twine is about 0.0354 of an inch in diameter.
6. Wood shafts (2)--6 feet long by 2 inches diameter, hickory or equal.
7. Net needle--1 medium size.

Even the amateur fisherman should have no difficulty in constructing a wade seine if he adheres to the following instructions and illustrations.

* Fishery Methods and Equipment Specialist, Exploratory Fishing and Gear Research Base, U. S. Bureau of Commercial Fisheries, Pascagoula, Miss.

U. S. DEPARTMENT OF THE INTERIOR Fish and Wildlife Service Sep. No. 750

Cut two 7-foot pieces from the end of the $\frac{1}{4}$ -inch nylon rope for breastlines (vertical lines at ends of net) and set aside. Make sure there are no kinks in the floatline or leadline. String all the floats onto the $\frac{1}{4}$ -inch nylon floatline. Tie one end of both the floatline and leadline to a post or other convenient support at waist level and about 2 inches apart. Secure the opposite ends in this position. Be careful not to stretch one line tighter than the other. If there is not enough room to stretch the lines their entire length, stretch out as much as possible. Now you are ready to start hanging the netting to the lines.

This is where you use the net needle (Knake 1947), a simple tool for storing the twine while the hanging-in is being done. The needle is pointed on one end so that it can be easily passed through the meshes. Near the pointed end is the tongue and at the opposite end is the fork. To fill the needle, take several turns around the base of the tongue with the end of the hanging twine (No. 9 spun nylon), and then wind the twine down the side, around the fork, up the opposite side, around the tongue and back to the other side. Continue winding tightly until the needle is full.

There are different opinions on how slack to hang the netting in a wade seine. Experience has shown that 60 percent of the stretched measurement of the netting gives favorable results. Since the seine described in this paper is of $2\frac{1}{2}$ -inch stretched mesh, 3 meshes will be hung on $4\frac{1}{2}$ -inch ties.

The hanging twine is secured to the floatline and leadline by a clove hitch.

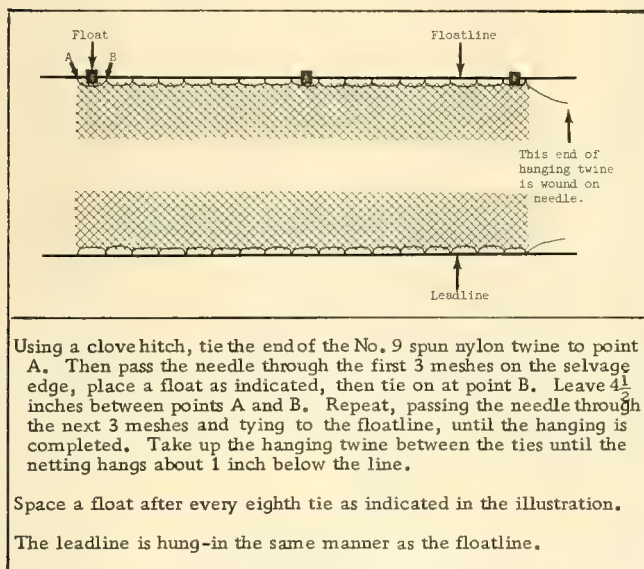


Fig. 1 - Hanging-in guide.

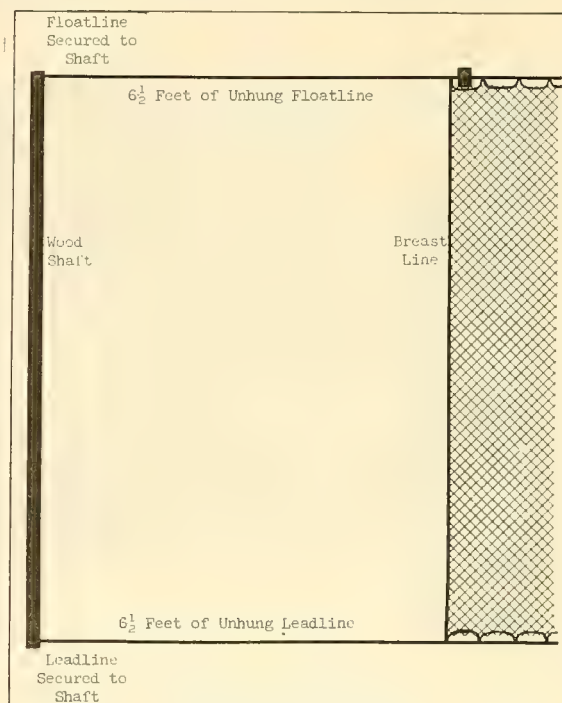


Fig. 2 - End of wade seine.

Using a piece of chalk or other marking device, mark the horizontally stretched floatline at $4\frac{1}{2}$ -inch intervals, beginning $6\frac{1}{2}$ feet from the end.

Use figure 1 as a guide for hanging-in the netting.

The hanging ties on the leadline are made opposite the hanging ties on the floatline. When the hanging-in is completed each line will have exactly the same number of hanging ties.

Next, weave the 7-foot lengths of $\frac{1}{4}$ -inch nylon rope, cut previously through all the meshes at each end of the netting, and use a clove hitch to secure the ends to the floatline and leadline. Lash in place with No. 9 spun nylon.

Use figure 2 as a guide for rigging the ends of the seine.

Make sure you have exactly $6\frac{1}{2}$ feet of unhung floatline and leadline on each end of the seine.

Next, secure the floatline to one end of a wood shaft and the leadline to the other end. Do this on each end of the seine. Use an equal amount of line on both ends in securing them to the shafts. This job completes the wade seine.

Leadcore rope is a relatively new product and certainly lessens the labor in wade seine construction. However, if leadcore rope is not available and individual leads are to be used, use 2-ounce seine leads, spaced at $1\frac{1}{2}$ -foot intervals, on $\frac{1}{4}$ -inch-diameter nylon rope.

A stretcher-type tray is an ideal seine container. This is easily constructed by centering and securing a 3-foot by 5-foot piece of canvas between two $6\frac{1}{2}$ -foot wood shafts.

Always wash and dry the seine thoroughly after each use. A netting preservative compound that is not harmful to synthetic materials is recommended to lessen abrasion.

METHODS

The object of wade seining is to surround the fish and haul them onto the beach. However, many controlling factors, such as water current, type of bottom, movement of fish, and turbidity have to be considered. As a general rule, the fisherman knows the area to be fished and can cope with the existing conditions. Some rules, however, will apply to most wade seine operations, among which are the following:

1. Schooled fish should be surrounded from a direction opposite to that of their travel (fig. 3).

2. If scattered fish are known to move with an existing current, and it is not too strong, haul against the current.

3. In instances where the seine is to be hauled a distance before landing, i.e., dragged over an area to accumulate scattered fish, the offshore end should be well ahead of the inshore end, and there should always be a bight of seine behind the inshore end (fig. 4).

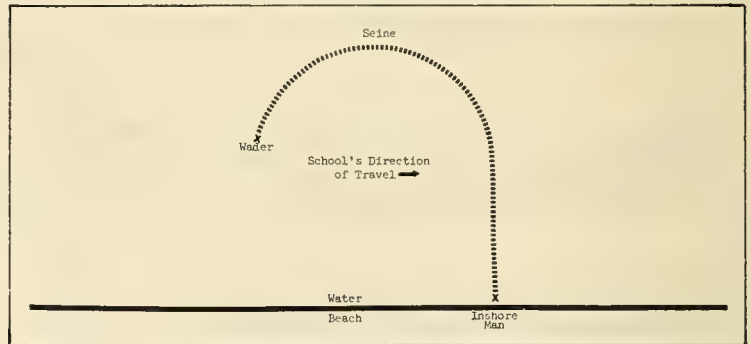


Fig. 3 - Surrounding a school of fish.

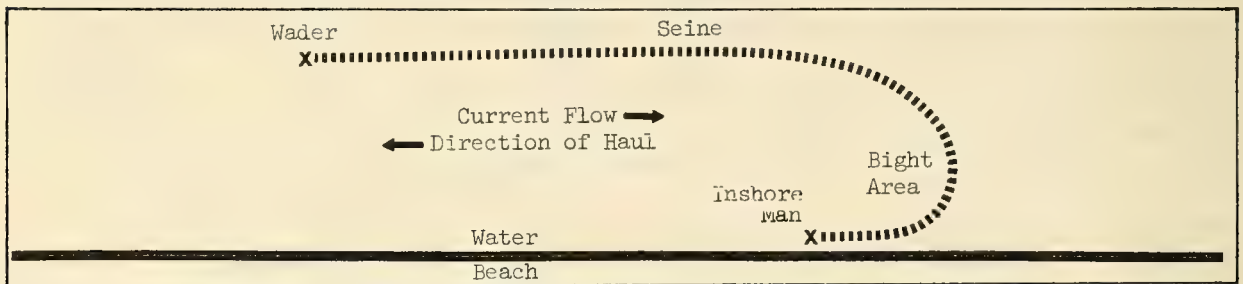


Fig. 4 - Hauling for scattered fish.

4. The inshore man should watch the bight for breaking or jumping fish and signal the wader when it is time to land the catch.

5. Never wade so deep that the net does not touch the bottom. Lack of bottom traction slows the movement of the seine and allows escapement around the offshore end.

6. While landing the net, keep the leadline as close to the bottom as possible, so it will not allow the fish to swim under and escape. Also, if the fish are jumping, holding the floatline up above the water surface will greatly reduce escapement.

7. Always keep noise to a minimum because it will scare the fish offshore. Likewise, lights shown on the water at night may frighten the fish.

Commercial wade seining on the northeast Florida coast is usually carried out by two men, the inshore man (who normally directs the operation) and the wader.

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SHRIMPETTI

Americans have enjoyed macaroni since Revolutionary days, but spaghetti was unknown here until much later. Thomas Jefferson spent considerable time and effort in Italy searching for a spaghetti-making machine. But it wasn't until the 1920s, when Italian restaurants became popular, that spaghetti was used in the home. From that time on, the public developed a great liking for spaghetti, and the making of pasta became an important American industry. Now it is said that more spaghetti is sold in New York City than in any other city in the world! Shrimp and spaghetti, a favorite combination in Italy, have become very popular in the United States. Shrimpetti, featured in many restaurants during Lent, will add sparkle to your home cooking.



SHRIMPETTI

1 tablespoon salt
3 quarts boiling water
8 ounces spaghetti
2 tablespoons butter or margarine
 $\frac{1}{3}$ cup olive oil
1 medium onion, sliced
1 clove garlic, minced
1 $10\frac{1}{2}$ -ounce can condensed tomato soup

$\frac{1}{2}$ cup water
1 tablespoon chopped parsley
1 pound shelled, deveined fresh shrimp,
or 1 (8 or 10 ounce) package frozen shrimp,
shelled and deveined
Salt to taste
Grated Parmesan or Romano cheese

Add 1 tablespoon salt to rapidly boiling water. Gradually add spaghetti so that water continues to boil. Cook, stirring occasionally, until tender. Drain. Meanwhile, melt butter or margarine. Add oil and heat 1 minute. Add onion and garlic and cook over low heat until onion is tender but not browned. Stir in tomato soup, water and parsley; cook over very low heat 10 minutes. Add shrimp and simmer about 5 minutes. Add salt to taste. Spoon over spaghetti. Serve with grated Parmesan cheese. Makes 4 servings. (J. Walter Thompson Co., New York City.)

TRENDS AND DEVELOPMENTS

TECHNICAL NOTE NO. 2--AN INEXPENSIVE SCALLOP CLEANER BUILT FROM SPARE PARTS

By Austin B. Williams*

A vacuum cleaner modified for cleaning scallop meats, and proven workable in pilot operation, produces clean meats at a rate comparable to that attained by manual shucking. Aside from an industrial machine in which heat is used for freeing the adductor muscle preparatory to vacuum cleaning (Bullis and Love 1961), little has been accomplished in mechanizing the scallop-shucking industry.

As with many of our seafood-processing operations in the Carolinas, shucking of bay and calico scallops requires much hand labor at a low rate of pay. Conditions under which the scallops are opened require that the meats be washed after shucking to remove sand, seaweed, undesired scallop tissue, etc. Often this results in an excessively soaked, inferior product. The machine-cleaning method described here eliminates the need for washing and thus assures a higher quality product. It also eliminates some of the labor from shucking.

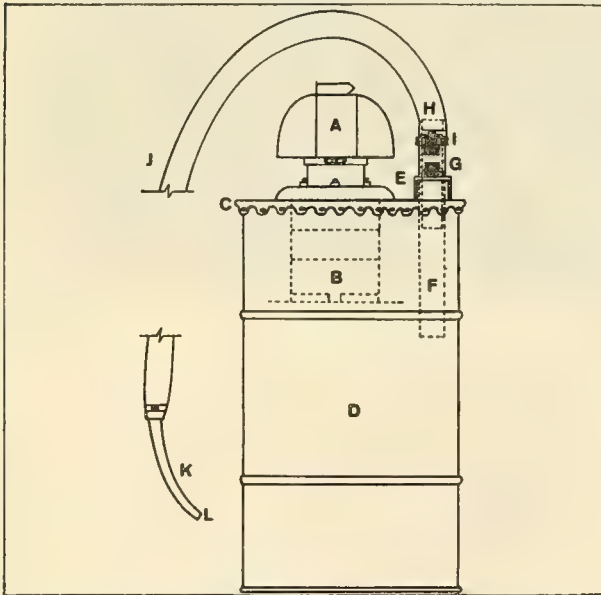


Fig. 1 - Side view of vacuum cleaner modified for cleaning scallop meats. (See text for explanation of labeled parts.)

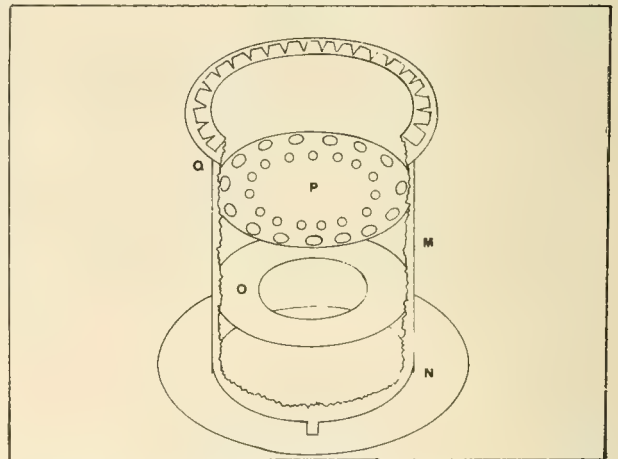


Fig. 2 - Enlarged cutaway view of baffle (part B) in fig. 1 made entirely of galvanized sheet metal: cylindrical portion (M) 6 inches in diameter by $6\frac{1}{2}$ inches deep, bottom deflector (N) separated from M by $\frac{1}{2}$ -inch space, lower internal plate (O) with $1\frac{1}{2}$ -inch center hole, upper internal plate (P) with row of $\frac{1}{2}$ - and $\frac{3}{8}$ -inch holes near circumference, relieved flange and ring (Q) for fastening to barrel lid.

*Associate Professor of Zoology, Institute of Fisheries Research, University of North Carolina, Morehead City, N. C. (R. A. David helped with development and assembly of this machine. Glenn P. Lewis made the drawings.)

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Sep. No. 751

An inexpensive scallop cleaner made from commonly available spare parts was assembled and tried in a laboratory and in shucking houses. The machine (figs. 1 and 2) is simply a modification of the "shop-type" vacuum cleaner in which a barrel is substituted for the often non-waterproof dust tank, and the motor is protected from moisture. A motor and fan housing (A) from an old, home tank-type vacuum cleaner and a sheet-metal baffle (B) are bolted to a hole cut off in the center of the lid (C) of a 125-lb.-capacity grease barrel (D) in such a way that the motor and fan housing are outside of the lid, and the baffle over the suction end of the fan housing is inside the barrel when the lid is in place. A second hole cut near the opposite side of the lid, and fitted with a $1\frac{1}{2}$ -inch brass-pipe coupling (E) soldered in place, is the suction inlet to the barrel. Screwed into this coupling is a 10-inch section of $1\frac{1}{2}$ -inch pipe (F) extending below the lower level of the baffle, and a 3-inch-long nipple (G) extending upward. A $1\frac{1}{2}$ -inch chromium-plated brass automobile tailpiece pipe (H) placed inside the nipple and coupling is held in place with a slip nut (I). A $4\frac{1}{2}$ -foot length of heavy $1\frac{1}{2}$ -inch rubber gasoline hose (J) is clamped to the tailpiece, and to the hose's outer end is clamped the metal, swiveled, suction nozzle (K) originally on the vacuum cleaner hose. The sharp edge of this nozzle is blunted, to prevent cutting the meats, by inserting a short length of 1-inch I. D. copper tubing (L) soldered at the terminal edge to the vacuum nozzle. Flexibility, which allows the nozzle to be positioned conveniently for the individual operator, comes from three sources: (1) the hose; (2) the tailpiece pipe which acts as a swivel; (3) the built-in swivel in the vacuum cleaner nozzle. Suction holds the lid in place.

Total cost of parts for this machine was less than \$5.00 exclusive of motor. The round holes in the drum lid were cut by a tinsmith, but the remainder was fabricated in a home workshop.

Shuckers of bay scallops, using the conventional method, have been timed at 10-14 scallops per minute. No special effort was made to find the fastest shucker. Many do not work that fast. The women timed were asked to use the scallop cleaner, and with very little practice opened and cleaned scallops at a rate comparable to that of their accustomed method. Practice would speed the process, which consists essentially of the following steps: (1) pick up scallop; (2) remove top valve of shell with knife; (3) present all tissue cupped in lower valve to suction nozzle; (4) suction removes all tissue and debris except the adductor muscle, leaving the meat in the shell, clean and ready to be removed; (5) clip cleaned adductor muscle into meat receptacle with knife, and discard empty lower valve of shell. In this sequence it is assumed that the suction nozzle is fixed in a convenient position. It is thought that improved and larger models with valved, multiple suction nozzles could be placed in commercial use at nominal cost.

Offal, presently discarded, is trapped in the barrel for easy transferral to a dehydrator. Bullis and Love (1961) assayed this material.

The hose and nozzle can be cleaned of slime by sucking a bucketful of water into the machine. The arrangement of parts keeps the baffle dry at all times; the latter is chiefly a safeguard for the nonwaterproof motor.

The most important features of this machine are: (1) initial low cost for family enterprises; (2) cleaner, unsoaked meats; (3) a somewhat more rapid method of opening than traditional methods; (4) recovery of offal for dehydration.

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Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, OCTOBER 1965:

U.S.S.R.: The major Soviet trawling effort in the Gulf of Alaska during the first half of October 1965, consisting of about 69 trawlers, 16 reefers, and a few support ships, operated exclusively off Dixon Entrance. After mid-month that fleet decreased to about 49 trawlers and 12 reefers, moving up the coast of southeast Alaska to Cape Ommaney. There was no Soviet activity in other areas of the Gulf until mid-October when two BMRT's appeared on Albatross Bank south of Kodiak Island. By the end of the month the Soviet fleet on Albatross Bank had increased to at least 7 BMRT factory stern trawlers.



Fig. 1 - Soviet research trawler.

In the central Aleutians a Soviet fleet of 12 trawlers and 3 reefers operated until about October 15 in the general area south of Segum Pass. During the last half of the month, that fleet was dispersed along the south side of the Aleutians, working as far westward as Amchitka Pass.



Fig. 2 - Soviet factoryship.

The Soviet ocean perch fleet in the western Aleutians operated throughout October in the vicinity of Attu Island. That fleet decreased to about 10 trawlers and occasional support ships during the month.

A total of 7 Soviet SRT-M side trawlers reappeared on the shrimp grounds east of the



Fig. 3 - Soviet SRT side trawler.

Shumagin Islands in late October. It was the first Soviet shrimp fishing activity observed in the area since mid-September.



Fig. 4 - Soviet tanker used to service fishing vessels.

Two Soviet whaling fleets operated south of the central and western Aleutians during October. The third whaling fleet had presumably departed waters off the Alaska coast.

Japan: A Japanese trawling fleet made up of 5 factory stern trawlers fished for Pacific ocean perch in the Gulf of Alaska between Portlock Bank and Albatross Bank during October. One of the trawlers left the area by the end of the month.



Fig. 5 - Japanese stern-ramp trawler.

One Japanese large stern trawler fished in the central Aleutians during the early part of the month, at which time she either moved beyond the Alaska region covered by patrols

or returned to Japan. Three stern trawlers fished Pacific ocean perch in the vicinity of Buldir Island in the western Aleutians, with one of the trawlers departing at the end of the month.



Fig. 6 - Catch aboard a Japanese trawler.

Two Japanese whaling fleets, consisting of 2 factoryships, 14 whale killers, and 2 reefers, which had been operating in the western Aleutians since about mid-August, left that area the first week of October. Those fleets were believed had returned to Japan.

The only Japanese shrimp fishing fleet (a factoryship and 8 trawlers) remaining in the Alaska region moved during the first week of October from the known shrimp grounds near the Pribilof Islands to off the Siberian coast. The following week that fleet returned to Alaska in the vicinity of Amchitka Pass and remained there for about a week when she left the area, presumably for Japan.

Two Japanese long-line vessels, one fishing off Middleton Island and one on Albatross Bank between Trinity and Chirikof Islands, ended operations in October, while a new vessel appeared off southeast Alaska.

JAPANESE CATCHES ON ALBATROSS BANK EXCELLENT:

A staff member of the U. S. Bureau of Commercial Fisheries spent a month during fall 1965 aboard the Japanese stern-ramp trawler Tokachi Maru. He witnessed 47 hauls for Pacific ocean perch in the Albatross Bank vicinity. Pacific ocean perch catches during that time accounted for 93 percent of the total catch tonnage. Sablefish,

blackthroat rockfish, pollock, and arrowtooth flounder made up the remainder of the catch. Even though sea conditions and weather were poor during the period (15-20 knot winds and swells of 15 to 20 feet nearly continuously), the Tokachi Maru had excellent fishing, with average catches per hour totaling over 12 metric tons. The vessels Tokachi Maru and Takachiho Maru were scheduled to fish until December, but the Daishin Maru No. 12 was reported en route to Japan. The vessels Taiyo Maru No. 82, Akebono Maru No. 53, and Koyo Maru, a new vessel, were expected to winter trawl in the Gulf of Alaska.

LARGER SHRIMP PROCESSED AT HOMER PLANT:

A new plant in Homer started processing larger sizes of Alaska shrimp. About 1,500 to 2,000 pounds of 40-60 count heads-off shrimp were delivered each day during October. The shrimp are cleaned, sorted, and packed in 3 or 5-pound cartons for sale fresh or frozen for the institutional market. The company is also processing king and Dungeness crab.

PROCESSING PLANT FOR BOTTOMFISH PLANNED AT KODIAK:

One of the major fish packers in Alaska has been interested in acquiring the middle section of the present city dock in Kodiak to establish a processing plant for bottomfish, scallops, and shrimp. Tentative plans are to produce both block frozen and packaged fillet products. Markets are said to have been established for the plant if it goes into production.

NEW KING CRAB-PROCESSING PLANT AT KODIAK:

A new king crab-processing plant (a converted liberty ship) in Kodiak began processing king crab in late September 1965. The new plant adds 100 new cannery jobs and provides a market for a sizable fleet of fishing vessels.



Alaska Fisheries Investigations

SCULPIN FEED HEAVILY ON PINK SALMON EGGS:

The movements and feeding of sculpin (Cottus aleoticus) were studied by the U. S. Bureau of Commercial Fisheries during summer and fall 1965 at Little Port Walter in Sashin Creek. This sculpin is found in great abundance in pink salmon streams at these latitudes. Over 2,700 sculpin were marked by fin removal and branding. Subsequent recoveries showed that the sculpin exhibited little movement until pink salmon spawning began after mid-August. By mid-September, much of the sculpin population had concentrated in the upper area of the Sashin Creek spawning ground. They fed mostly on pink salmon eggs after mid-August. Observations were being continued, and the number of pink salmon eggs removed from Sashin Creek were being computed.



American Fisheries Advisory Committee

RECOMMENDATIONS AT MEETING IN CALIFORNIA:

At a 4-day meeting in San Pedro, Calif., October 25-28, 1965, the American Fisheries Advisory Committee recommended that the United States continue its efforts for international cooperation in conserving the yellowfin tuna stocks of the tropical Pacific Ocean. Participation by all nations fishing for yellowfin tuna on a substantial basis should be sought so that perpetuation of the resource can be assured, the Committee said.

The Committee also recommended: (1) an expanded oceanographic research program upon which to base wise management of the fisheries resources which are vital to the economic well-being of the United States fishermen; (2) further development and promotion of presently underutilized species to enhance the economic status of the industry; (3) further development of a fishery marketing program recognizing the capabilities and responsibilities of both industry and government; and (4) greater industry support of legislation favorable to the conservation of fisheries resources for the benefit of all Americans.

The Committee pointed out that there is a continuing need for training commercial fishermen and engineers and that greater efforts are required to protect the inshore coastal waters from the hazards of pesticides and pollution.

Discussions at the meeting included harvesting and utilization studies by the Bureau on Pacific Ocean hake, and progress made in State-Federal cooperative research and development programs under Public Law 88-309 (also known as the Commercial Fisheries Research and Development Act of 1964).

The Committee was established in 1955 under the Saltonstall-Kennedy Act to advise the Secretary of the Interior on fisheries matters. Dr. Stanley A. Cain, Assistant Secretary of the Interior for Fish and Wildlife and Parks is the Committee's chairman.

Note: See Commercial Fisheries Review, July 1965 p. 18.



American Samoa

TUNA FISHING FLEET:

During September 1965 a total of 96 foreign tuna fishing vessels were fishing out of American Samoa. They consisted of 58 Japanese, 27 South Korean, and 11 Formosan vessels. (Suisancho Nippo, October 29, 1965.)



California

ALBACORE TUNA MIGRATION STUDIES:

M/V "N. B. Scofield" Cruise 65-S-3-Albaco (May 25-June 23, 1965): To intercept schools of albacore tuna and determine their migration route into the mainland fishing grounds was the primary objective of this cruise by the California Department of Fish and Game research vessel N. B. Scofield. The cruise area ranged 700 miles offshore, between the latitudes of Guadalupe Island and Monterey, Calif. The vessel was unsuccessful in catching any albacore while trolling 7 jig lines over 2,500 nautical miles.

Another objective of the cruise was to collect oceanographic meteorological, and biological data which may be related to albacore occurrence.

Sea surface temperatures were obtained by bucket thermometer and by a thermograph which was operated continuously during the cruise. Temperatures ranged from 56.1° F. outside southern California's Channel Islands to 64.4° F. at the survey's southwestern margin.

A total of 78 bathythermograph (BT) casts was made at approximately 40-mile intervals. The BT slides were read, coded, and forwarded to the National Oceanographic Data Center in Washington, D. C., via the U. S. Bureau of Commercial Fisheries Radio Station WWD. A Nansen-bottle cast at each BT station provided temperatures at a depth of 10 meters (32.8 feet), and water samples for use in salinity determinations. Standard weather observations were made every 6 hours.

Specimens of marine life were collected at night-light stations while the vessel was on sea anchor. One pomfret (Brama japonica) and 330 large jack mackerel (Trachurus symmetricus) were caught at night with a rod and reel. Pacific sauries (Cololabis saira) and lanternfish (Myctophidae) were observed at every station worked. Saury were the most plentiful species, ranging from a few fish to schools of several hundred. Four blue sharks (Prionace glauca) were tagged and released for the U. S. Bureau of Commercial Fisheries. The most common invertebrates attracted to the nightlight were pteropods, cephalopods, heteropods, coelenterates, and tunicates.

Birds identified during the cruise were the black footed albatross, petrels, Xantus's murrelet, redbilled tropic bird, and a Laysan albatross.

Nothing was caught in one midwater trawl tow, and sea conditions prevented further tows.

Note: See Commercial Fisheries Review, November 1964 p. 23.

CALIFORNIA HALIBUT TAGGING AND RELATED STUDIES:

M/V "N. B. Scofield" Cruise 65-S-4-California Halibut (August 3-19, 1965): To tag legal-sized California halibut and collect supplemental age and growth information from selected halibut was the objective of this cruise by the California Department of Fish and Game research vessel N. B. Scofield. The Ventura Flats, Channel Islands, and Santa

Barbara area comprised the general area of investigations.

During the cruise, age and growth data were taken from 27 large halibut ranging up to 36 pounds. Nineteen of those fish were large males, rarely seen in previous samples. Attempts to obtain samples of 0- and 1-ring halibut at Ventura Flats, Santa Rosa Island, Santa Cruz Island, and Goleta were unsuccessful. In all, 632 California halibut were measured, tagged, and released.

A tagged halibut released in March 1965 from the research vessel Alaska was recaptured, measured, and released. In the 162 days that fish was at liberty, it traveled 37 miles and suffered a growth loss of 0.3 inch, probably from handling and tagging shock.

A number of flatfish (Xystreurys liolepis, Parophrys vetulus, and Pleuronichthys verticalis) caught on the cruise were donated for research with animal chromosomes.

ROCKFISH SPECIES COLLECTED FOR BIOLOGICAL STUDIES:

M/V "N. B. Scofield" Cruise 65-S-5-Rockfish (August 30-September 16, 1965): To obtain species of rockfish (family Scorpaenidae) for biological studies was the principal objective of this cruise in the vicinity of the southern California islands and offshore banks by the research vessel N. B. Scofield of the California Department of Fish and Game.

To save eye lenses from certain species for comparison of their proteins as a possible means of separating non-interbreeding populations was another objective. These were taken from a number of rockfish species and frozen for appraisal at the California State Fisheries Biological Laboratory.

During the cruise, hook-and-line fishing was conducted in depths from 10 to 275 fathoms, but mostly shallower than 150 fathoms because of faulty wire on the deep-sea reels. Of the 33 species of rockfish caught, the vermilion rockfish (Sebastes miniatus) were predominant and were taken in all general areas fished. Nearly as common were the green-spotted (S. chlorostictus) and pink rockfish (S. eos), followed by rosy (S. rosaceus), starry (S. constellatus), bocaccio (S. paucispinis), chilipepper (S. goodei), and speckled

rockfish (*S. ovalis*). The largest rockfish caught was a 22-pound cow (*S. levis*), a species that appears to favor bank habitats rather than areas adjacent to land masses.

A number of rockfish were frozen for taxonomic studies. Examination of freshly caught specimens during the cruise indicated that the species *S. rufus*, previously considered a synonym of *S. ovalis*, is a separate species.

Other than rockfish, the most commonly caught fish of the cruise was the Pacific sand-dab (*Citharichthys sordidus*). Ocean whitefish (*Caulolatilus princeps*) and sheephead (*Pimelometopon pulchrum*) also were common. Blue sharks (*Prionace glauca*) were a nuisance in some of the areas fished.

Surface sea water temperatures taken varied from 61° to 69° F., but 65° F. water was the usual thing.

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FALL 1965 PELAGIC FISH POPULATION SURVEY:

M/V "Alaska" Cruise 65-A-6-Pelagic Fish (July 22-August 6, 1965): The objectives of this cruise by the California Department of Fish and Game research vessel Alaska in the coastal waters of southern Baja California from Magdalena Bay to Punta Eugenia were to: (1) survey the fish and invertebrates of the inshore pelagic environment; (2) assess the distribution, abundance, density, age and size distribution, and recruitment of pelagic fish populations; (3) obtain samples for blood genetic studies by the U. S. Bureau of Commercial Fisheries; (4) bring back 1965 year-class sardines for growth studies by the U.S. Bureau of Commercial Fisheries; (5) collect eye lenses of important sport and commercial fish species for racial studies; and (6) collect sharks and rays for the Los Angeles County Museum.

This was the first of 5 cruises scheduled for fall 1965 to survey the coast between Magdalena Bay, Baja California, and San Francisco. Midwater trawl and night-light stations, and scouting at night between stations comprised the survey. Since this year's (1965) survey was shorter than usual, no special efforts were made to obtain young sardines alive, midwater trawl coverage was somewhat less intensive, and light stations were more numerous in the southern part of the survey area.

A total of 28 night-light/blanket-net stations was occupied during the cruise--16 in the Magdalena Bay area, 5 around Punta Abreojos, 5 near Punta Asuncion, and 2 near Turtle Bay. There were 22 midwater trawl tows made--4 in or near Magdalena Bay, 7 between Cabo San Lazaro and Punta Abreojos, and 11 between Punta Abreojos and Punta Eugenia. A total of 86 miles was scouted while running between light stations at night.

PACIFIC SARDINES: Sardines (*Sardinops caeruleus*) were taken in 5 midwater trawl tows and at 4 night-light stations. Six of the 9 catches were made in the Magdalena Bay-Santa Maria Bay area and 1 each near Punta San Juanico, Punta Abreojos, and Punta Eugenia. One sample from Magdalena Bay, 2 from Santa Maria Bay, and 1 from Punta Abreojos were fish-of-the-year, with most fish ranging from 100 to 130 millimeters (3.9 to 5.12 inches) long. The remaining 3 samples from the Magdalena Bay area and the sample from Punta San Juanico were sub-adults, with most between 130 and 170 millimeters (5.12-6.69 in.) in length. Only one sample of adults was taken; those were caught just south of Punta Eugenia and were mostly between 180 and 210 millimeters (7.09-8.3 in.) long.

Sardines were about as abundant as the previous year in the Magdalena Bay area, and young fish in almost pure schools made up a large part of the catch for the second straight year. Catches north of Punta Abreojos were poorer than in the previous 2 years, being comparable to the poor catches made in 1962.

NORTHERN ANCHOVIES: Anchovies (*Engraulis mordax*) were taken in 15 trawl tows and at 1 light station. As has been the pattern in recent years, anchovies were taken at most stations and in the largest quantities. Also fitting the pattern were the far greater number of anchovy samples taken with the midwater trawl and the small quantities in many trawl catches (7 of the 15 trawl catches yielded less than 5 pounds).

A total of 13 anchovy catches were made north of Punta San Juanico. The best catches were made between Punta Abreojos and Punta Asuncion, where 3 tows made over a 20-mile stretch yielded about 1 ton of fish each. The only successful light station was in Magdalena Bay, where a little school of small fish (39-65 millimeters or 1.5 to 2.6 inches long) was attracted to the light.

The samples caught below Punta Abreojos consisted mostly of young fish ranging up to 90 millimeters (3.5 in.) long. The anchovies taken north of Punta Abreojos were somewhat larger, with most ranging in length from 100 to 130 millimeters.

Anchovy catches were similar to those made during the previous two years, although the large concentration of young anchovies noted in Magdalena Bay in the 1964 survey was absent in 1965.

PACIFIC MACKEREL: Pacific mackerel (*Scomber diego*) were taken in 3 trawl tows and at 1 light station, all south of Punta San Juanico. All catches were small and consisted of fish under 100 quarter-centimeters long. Those catches were even poorer than during 1964, which was by far the poorest of the previous 3 years.

JACK MACKEREL: Jack mackerel (*Trachurus symmetricus*) were taken in 8 trawl tows and at 6 light stations. The trawl catches consisted of from 1 to 12 small fish (18 to 43 quarter-centimeters long) scattered throughout the survey area. Five of the 6 night-light stations where jack mackerel were attracted were in Santa Maria Bay. The best catches there consisted of fish ranging from about 75 to 85 quarter-centimeters. No larger jack mackerel were taken. That species was about as abundant as during the previous 3 years.

OTHER SPECIES: Pacific round herring (*Etrumeus teres*) were taken at 7 trawl and 3 light stations, mostly south of Punta San Juanico. Thread herring (*Opisthonema* spp.) were taken at only one trawl station.

Pacific pompano (*Palometa simillima*) were taken frequently with the midwater trawl and made up an important part of the catch. They were taken in 13 tows, with catches of up to 700 individuals. Most were small, ranging from about 70 to 160 millimeters (2.8-6.3 in.) long.

California lizardfish (*Synodus lucioceps*) were also a frequent constituent of the trawl catch. They appeared in 9 tows in amounts up to 1,100 individuals and were all quite small, ranging from about 90 to 150 millimeters (3.5-5.9 in.) long.

Pelagic red crab (*Pleuroncodes planipes*) were caught in 9 trawl tows in amounts rang-

ing up to about a ton. Most of the catches were made south of Punta Abreojos and were also present at 4 light stations. Squid (*Loligo opalescens*) were present at 10 light stations and were caught in 10 trawl tows.

OTHER ACTIVITIES: Night scouting was accomplished only while running between light stations and the coverage was quite limited. A total of 69 anchovy, 4 mackerel, and 36 unidentified schools were seen. Most of the anchovy schools were near Punta Abreojos, and most of the unidentified schools were near Punta Asuncion.

Sea surface temperatures during the cruise ranged from 13.4° C. (56.1° F.) near Punta Eugenia to 23.3° C. (73.9° F.) just north of Cabo San Lazaro. Temperatures were again quite cool north of Punta Abreojos, with most readings between 16.0° and 19.0° C. (60.8° and 66.2° F.). Weather and sea conditions were good during the entire cruise and permitted completion of all planned work.

M/V "Alaska" Cruise 65-A-7-Pelagic Fish (August 17-September 3, 1965): The coastal waters of central Baja California, Mexico, from Cedros Island to Point Canoa were surveyed on this cruise. Objectives were to: (1) survey the fish and invertebrates of the inshore pelagic environment; (2) determine the amount of recruitment from the 1965 Pacific sardine spawning and to measure the population density of older fish, (3) determine the distribution and abundance of northern anchovies, Pacific mackerel, and jack mackerel; (4) collect eye lens of various species for genetic studies.

The survey was conducted by fishing a midwater trawl and a blanketnet at night. A total of 21 midwater-trawl and 18 blanketnet stations was occupied, and 147 miles of night visual scouting were logged.

Anchovies were caught on 13 stations, sardines on 9, jack mackerel on 5, and Pacific mackerel on 2. All but 4 sardine samples and one jack mackerel sample were taken on midwater trawl stations. Night scouting detected 30 anchovy and 2 sardine schools. Squid, salps, and ctenophores were caught in small quantities, rarely exceeding 10 pounds per catch. Mechanical difficulties prevented completion of work scheduled for this cruise.

NORTHERN ANCHOVIES: Anchovies were present in the vicinity of Cedros Island and

in the northern half of Sebastian Vizcaino Bay. Extremely heavy concentrations of small fish (66-88 millimeters or 2.6 to 3.5 inches long) were schooled in South Bay, Cedros Island. A 30-minute trawl tow there took 650 pounds, the best catch of the cruise.

From Santa Rosalia Bay northward, anchovies became increasingly abundant although very few were caught less than 3 miles from shore. Adults predominated in that area, with most fish exceeding 110 millimeters (4.3 inches) in length. Catches ranged from several fish up to 2,700 fish (35 pounds).

Anchovies were very scarce in the southern half of Sebastian Vizcaino Bay where sardines were predominant. Almost all school sightings were made off Blanca Bay; they were large in area but thin in depth. Trawls on those schools yielded poor catches because the net passed beneath the fish. Blanketnet stations were totally ineffective in sampling anchovies due to negative phototactic behavior of this species. But catches were considerably better than on the previous year's survey, and adult fish made up a greater proportion of the catch.

PACIFIC SARDINES: Sardines were present in South Bay, Cedros Island, and in the southern portion of Sebastian Vizcaino Bay. The 1965 year-class appeared to be another failure, as only one definite fish-of-the-year was taken. Many adult fish were in a spawning condition. Catches were considerably better than in the previous year when sardines were scarce throughout the survey area. The sardine-anchovy distribution in Sebastian Vizcaino Bay closely resembled that of the previous several years, with each species dominating a particular area of the bay. Both types of sampling gear were equally effective in catching sardines.

JACK AND PACIFIC MACKEREL: Both those species were taken in minor quantities amounting to several individuals per sample. All fish, except one sample of jack mackerel were under 100 millimeters (3.9 inches) long. No schools were seen in the survey area.

OTHER ACTIVITIES: Round herring (*Etrumeus teres*) were frequently caught mixed with sardines, and Pacific pompano (*Palaemonetes simillima*) were commonly taken with anchovies. Midshipmen (*Porichthys myriaster* and *P. notatus*) appeared frequently in the trawl catches.

Sea surface temperatures taken on the cruise ranged from 75° F. at Point Malarri-mo to 65.5° F. at Blanca Bay.

M/V "Alaska" Cruise 65-A-8-Pelagic Fish (September 15-October 3, 1965): The coastal waters of northern Baja California, Mexico, from Acme Rock to the international border were surveyed during this cruise by the research vessel Alaska. Objectives were to: (1) determine the distribution and abundance of northern anchovies, Pacific mackerel, and jack mackerel; (2) determine the amount of recruitment of the 1965 Pacific sardine spawning and to measure the population density of older fish; (3) field test and evaluate a 30-foot midwater-trawl as a sampling tool; (4) collect anchovy stomachs for a food study conducted by the California Academy of Sciences; and (5) make incidental collections for aquarium display and taxonomic study.

The survey was conducted at night using a midwater-trawl and a blanketnet as sampling devices. A total of 51 midwater-trawl and 29 blanketnet stations was occupied, and 374 miles were visually scouted during the cruise. The trawl caught anchovies on 43 stations, jack mackerel on 13, sardines on 5, and Pacific mackerel on 2. The blanketnet took anchovies on 3 stations, sardines on 1, and jack mackerel on 2. Anchovies were present on 4 other blanketnet stations but none could be caught. Visual scouting detected 3 anchovy schools and 6 areas of anchovy surface scatter.

NORTHERN ANCHOVIES: Concentrations of fish were found between Acme Rock and Point Canoas, off Geronimo Island and Point San Jose, and in Colnett Bay. Trawl catches of 400 to 2,000 pounds were made in those areas, and echo-sounder fish traces were quite heavy. Catches elsewhere were generally light, with about 60 percent of all tows containing less than 1,000 fish. Echo-sounder traces were very light outside the areas of anchovy concentration.

Juvenile fish (under 90 millimeters or 3.5 inches long) were especially prevalent from Todos Santos Bay northward. Fish of that size were distributed close to shore, while adult fish were generally found 5 or more miles offshore.

Anchovy catches were quite similar to those of the previous year, except a few more large catches were made in 1965. There was

a noticeably larger proportion of "pinhead" sizes (less than 70 millimeters) on this cruise. Echo-sounder school traces were considerably lighter than during the previous several years.

PACIFIC SARDINES: Sardines were scarce over the entire survey area. Catches were very small, with most consisting of only a few individuals. Adults were taken off Point Canoas and San Carlos Anchorage, and in San Quentin Bay. Most of the larger fish were in spawning condition. The sample taken in San Quentin Bay contained some of the largest fish ever taken by the survey in Mexican waters and ranged up to 235 millimeters (9.3 inches) long. Fish of the 1965 year-class were extremely scarce. Samples consisting of 1 or 2 fish were taken at 3 widely separated stations.

JACK AND PACIFIC MACKEREL: Juvenile jack mackerel were taken in small quantities by the trawl. Most fish were less than 160 millimeters long and appeared to be fish-of-the-year. Adult fish apparently were able to avoid the trawl since only a few individuals of both species of mackerel were taken. One large school of adult jack mackerel was sampled by blanketnet in San Quentin Bay.

MIDWATER TRAWL FIELD TEST: A new midwater-trawl with a 30-foot-square mouth opening was tested as a possible substitute for the 50-foot trawl being used. The smaller net fished with a mouth opening estimated at 25-27 feet. It had small hydrofoil doors at the upper corners to spread the net horizontally and a combination of curved steel quarter doors at the lower corners and floats on the headrope to spread the net vertically. Towing speeds of up to 4 knots were achieved with no difficulty.

Although no direct comparative tows were made, the smaller net appeared to catch fish as effectively as the larger one. It caught all the program species including several large Pacific mackerel, a species which is not readily taken even with a large trawl. Several catches exceeded 400 pounds, while 40 percent of the successful tows contained 1,000 or more fish.

The greatest advantage of the small net is in the speed and ease with which it can be handled. It can be set and retrieved in one-third the time, and requires one-half as many men to operate than the larger net. Also, the smaller size and weight of all components

make it much safer to handle and thus permits the vessel to operate under more adverse weather conditions. From all indications this net will make an excellent sampling tool.

OTHER ACTIVITIES: Fair weather prevailed on this cruise and all scheduled work was completed. Sea surface temperatures ranged from 69° F. off Acme Rock to 60° F. at Point San Jose.

Note: See Commercial Fisheries Review, August 1965 p. 25.

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MARINE LIFE EXPLORATIONS OFF SANTA CATALINA ISLAND:

M/V "Nautilus" Cruise 65-N-4-Exploratory (August 13-16, 1965): To conduct an ecological survey from about 100 feet of water to deep water around Santa Catalina Island was the main objective of this cruise by the research vessel Nautilus of the California Department of Fish and Game. Other objectives were to sample the marine plant and animal life of the island area with a small mid-depth trawl and lobster and fish traps. Plans were to set lobster traps in depths of 100 to 600 feet in an effort to obtain information on depth distribution of lobsters.

During the cruise, lobster traps and fish traps were wired together and fished in depths of 100 to 600 feet at 50-foot depth intervals on Farmsworth Bank in the offshore waters of Santa Catalina Island. The only trap that caught lobsters (Panulirus interruptus) was one placed at 100 feet. That trap also caught 2 swellsharks (Cephaloscyllium uter), 1 treefish (Sebastodes serripes), and 1 red starfish. Traps set at 150 and 200 feet caught no lobsters but caught some fish--sheephead (Pimelometopon pulchrum), swell sharks, sculpin (Scorpaena guttata), and rockfish (Sebastodes spp.). Starfish and a few snails were also taken in the traps placed at those depths.

The traps set in depths of 300 to 600 feet were lost and a three-day search for them was unsuccessful.

Shallow hauls with the midwater trawl yielded no fish, and a deeper haul at 100 fathoms resulted in a badly torn net when it snagged on what presumably was a rock pinnacle.

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MARINE SPORT FISH SURVEY OFF SOUTHERN CALIFORNIA:

Airplane Survey Flight 65-12 (September 13, 1965): This one-day survey was one in a series of instantaneous counts of poles and fishermen along the coastline. For this purpose, the southern California coastline from the Mexican Border to Jalama Beach State Park was surveyed from the air by the aircraft Cessna "182" N9042T of the California Department of Fish and Game. The counts made will eventually be used to determine shore-fishing effort in southern California.

The coastline was surveyed from south to north between 11:05 a.m. and 3:15 p.m., with a 1-hour stop at Goleta at 1:26 p.m.

A total of 118 fishermen and poles was counted during the survey. Eighteen persons (15.25 percent) were outside the project's regular shoreline sampling frame. Areas of heaviest effort were: south Camp Pendleton to San Clemente, Newport Beach to the Long Beach Rainbow Pier, and the Hollywood and Mandalay Beach area in Ventura County. Those three areas contained 41.5 percent of the fishermen counted.

Considerable fishing effort was noted in areas not included in the scheduled shoreline sampling. These survey flights will aid in determining appropriate correction factors for those activities.

Airplane Survey Flight 65-13 (September 28, 1965): This was another one-day survey flight by the Cessna "182" N9042T for the instantaneous count of poles and fishermen along the coastline of southern California. From the Mexican border north to Jalama Beach, the coastline was surveyed between 10:00 a.m. and 2:00 p.m., with a 1-hour stop at Goleta at 12:30 p.m.

In all, 114 poles were counted with 111 attending fishermen. Thirteen percent of the poles counted were outside the regular shoreline sampling area. Greatest concentrations of fishing effort were: Leo Carrillo State Beach north to Ventura, with 37 poles tallied (32.5 percent), and the Bolsa Chica Beach to Point Fermin area (19 poles; 16.6 percent).

Considerable fishing effort again was noted taking place outside of the line areas pre-selected for sampling. As determined from eight flights in 1965, this "outside effort" amounts to about 10 percent of the total noted.

These data will be used to adjust shoreline sampling estimates for those areas not covered, and to substantiate areas of greatest fishing activity.

Note: See Commercial Fisheries Review, August 1965 p. 27.

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SEA OTTER POPULATION SURVEY:

Airplane Spotting Flight 65-11-Sea Otter (September 15, 1965): To obtain a count of California sea otters (*Enhydra lutris nereis*), the California coastline from Cayucos to Monterey was flown on September 15, 1965, by the aircraft Beechcraft N5614D of the California Department of Fish and Game. It was the third flight in a series of four to make aerial sea otter counts for 1965.

Weather conditions were marginal during the flight and extensive fog patches along the coast restricted visibility considerably. Weather conditions also delayed the airplane's takeoff so the count was made later than the optimum hours most effective for this type of survey. Because of the marginal flying conditions, together with the fact that the otters were widely scattered, a low count was obtained. The total count taken by three spotters was 905 otters.

Note: See Commercial Fisheries Review, May 1964 p. 13.

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ANCHOVY FISHING PROPOSALS RESET FOR CONSIDERATION BY STATE FISH AND GAME COMMISSION:

Proposed 1965/66 regulations to govern an experimental commercial anchovy reduction fishery in California's offshore waters were rescheduled for consideration November 12, 1965, at a California State Fish and Game Commission meeting in San Diego. (At its October 1 meeting in Los Angeles, the Commission had tentatively deferred action on the proposed anchovy regulations until December 10, and adopted a resolution requesting the Governor to place the entire question of anchovy and sardine resource management before the Special Session of the California Legislature.)

In announcing his decision to reset Commission consideration of proposed regulations and permits to the November 12 agenda, the Commission president said, in part, "Since legislative resolve of the matters identified in our resolution obviously will not be forthcoming before December 10, there appears

to be no justification for further delay of Commission action on the proposals and applications now on file"

The proposed regulations would permit an experimental fishery for the taking of up to 115,000 tons of anchovies through April 30, 1966, by commercial fishing vessels for reduction into fish meal and other byproducts. The California Department of Fish and Game recommends that 100,000 tons be taken in Southern California waters and 15,000 tons from offshore waters north of Point Conception.

The proposal emphasizes the experimental nature of the recommended regulations, and would provide that the commercial anchovy reduction fishery may be terminated at any time the Commission feels such action would be in the best interest of the pelagic fish resource.

Consideration of applications from nine commercial fishery firms for anchovy reduction permits was also scheduled for the November 12 meeting. (California Department of Fish and Game, October 30, 1965.)

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EMPLOYMENT OPPORTUNITIES FOR BIOLOGISTS WITH CALIFORNIA DEPARTMENT OF FISH AND GAME:

The California State Personnel Board has announced open nationwide examinations for qualified biologists interested in career employment with the California State Department of Fish and Game as follows:

<u>Classification</u>	<u>Monthly Salary</u>
Fishery Biologist II	\$590-717
Marine Biologist II	590-717
Fishery Biologist III	717-870
Pollution Bioanalyst II	590-717
Pollution Bioanalyst III	717-870
Pollution Bioanalyst IV	829-1,088
Marine Biologist III	717-870

For the first three positions listed, the closing date for filing applications is February 4, 1966, and written examinations will be given March 6, 1966. For the last four positions listed, the closing date for filing applications is January 28, 1966, and written examinations will be given February 26, 1966.

Written examinations and subsequent personal interviews for applicants will be held in California and such other States as the number of candidates warrant and conditions permit. Personal interviews are planned for certain major cities throughout the United States. Admission to the examinations requires a college degree in biological sciences and varying amounts of either graduate work or experience in fishery research or water pollution studies.

Interested persons may obtain applications and further information by writing: State Personnel Board (Attn: Recruitment Section), 801 Capitol Mall, Sacramento, Calif. 95814.



Cans--Shipments for Fishery Products, January-August 1965

A total of 2,077,256 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-August 1965 as compared with 1,918,909 base boxes used during the same period in 1964. In 1965, there was an increase in the U. S. canned pack of Maine sardines and Gulf shrimp, but there was some decline in the pack of canned tuna and salmon.



Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.



Caribbean and Tropical Atlantic Fisheries Explorations

TRAWLING EXPLORATIONS IN SOUTHERN CARIBBEAN:

M/V "Oregon" Cruise 104 (September 14-October 30, 1965): Exploratory fishing with trawls, long lines, and other types of gear was conducted in the southern Caribbean Sea by the U. S. Bureau of Commercial Fisheries research vessel Oregon during September and October 1965. Working in cooperation



Areas investigated during Cruise 104 of the M/V Oregon (September 14–October 30, 1965).

with the Instituto Venezolano de Investigaciones Científicas (IVIC) and the United Nations Special Fund Caribbean Fisheries Project (UNSCFP), the Oregon carried out trawling explorations off central and western Venezuela, in the Gulf of Venezuela, and in the area surrounding Aruba, Netherlands Antilles. A fall-season survey of the outer shelf brown-shrimp beds off southern Colombia found by the Oregon during a trawling survey in 1964 was also completed on this cruise. Night long-lining for swordfish was carried out in coordination with the hydrographic track of the Bureau's research vessel Geronimo, which was transecting the southern Caribbean region at the same time.

During this cruise, fishing activities conducted were: 60 shrimp trawl stations (44 at shelf depths, 16 at slope depths); 15 fish trawl stations; 24 dredge stations; 5 long-line stations (500 to 890 hooks each); 5 hand-

line stations; 2 gill-net stations; and 5 night-light-dip net and 7 temperature stations.

SHRIMP: Shallow-water shrimp catches were generally poor. Exploratory drags were made with 40-foot flat trawls. Double-rig drags were made using 40-foot and 65-foot flat trawls. Hourly catch rates east of 70° west longitude were all below 5 pounds per hour. Two transects in the Gulf of Venezuela (made in cooperation with IVIC) caught brown shrimp at rates of 20 pounds per hour or less, and white shrimp at rates of 12 pounds per hour or less. Heavy seas and 65-knot winds interrupted further planned studies in the Gulf. West of Pen. de Guajira catch rates of brown shrimp were under 10 pounds per hour. Off southern Colombia, between Pta. San Bernardo and Cabo Tiburon in depths of 25 to 40 fathoms, catches of brown shrimp in mixed sizes (averaging 31-35 count heads-off) reached a high of 58 pounds in a 90-minute drag with a

65-foot trawl. Two and three-hour drags with double-rigged 40- and 65-foot nets yielded catches of 50 to 70 pounds of heads-on brown shrimp which yielded under 2 boxes of headless shrimp per night. Those catches were uniformly lower than those made during the spring 1964 cruise.

Deep-water shrimp concentrations were also low. Royal-red shrimp catches of 20 and 35 pounds, and mixed species catches of 50 pounds were made in 250 to 275 fathoms off the Golfo de Triste, Venezuela. Catches off Pena. de Paraguana, Pena. de Guajira, and southern Colombia were under 10 pounds per hour.

SWORDFISH: Two to four swordfish ranging from 25 to 225 pounds each were taken on all long-line sets, with the exception of a set made off Guajira. The Guajira set yielded a record catch of 103 sharks--101 were silks weighing a total of 7.5 tons. Excessive gear damage was experienced, including the loss of 16 baskets (160 hooks) of long-line gear.

FISH TRAWLING: An experimental fish trawl was tested on rough bottom areas west of Aruba and off Guajira. Food fish catches were small, the best haul accounting for only 88 pounds of grouper and snapper. The catches from the Aruba area were very poor and dredge sampling indicated only "dead bottom."

TUNA OBSERVATIONS: Trolling lines were run between stations and while cruising during daylight hours. Trolling catches made consisted of 7 blackfin tuna, 7 yellowfin tuna, 9 white skipjack tuna, 1 little tuna, 13 dolphin, 1 king mackerel, 1 wahoo, 5 barracuda, 1 spearfish, and 1 frigate mackerel. Identified tuna schools off Venezuela and Colombia included 5 blackfin, 2 yellowfin, 4 skipjack, and 1 little tuna. On October 19, numerous large schools of small blackfin (estimated 3-5 pounds average) were observed and photographed 8 to 12 miles off Pta. de San Blas, Panama.

Note: See *Commercial Fisheries Review*, September 1965 p. 43; January 1965 p. 19; September 1964 p. 22.



Central Pacific Fisheries Investigations

FUNCTION OF DARK AND LIGHT MUSCLE IN TUNA STUDIED:

The backbone of the skipjack tuna is sheathed in a dark red muscle. Outside the

dark muscle lies a thicker layer of muscle lighter red in color. The two types of muscle differ sharply in their chemical makeup. This has suggested to at least one European scientist, who worked on a related species of tuna, that the relatively small dark muscle is "scarcely suited for strenuous and continued activities." He believes that the dark muscle in fish is somewhat similar to the liver in man--a storage organ in which certain substances are held until required by the body. This rather widely accepted hypothesis has now been challenged by an electrophysiologist working in Hawaii.

A study of the function of dark and light muscle in various species of tuna is being conducted under a contract between the University of Hawaii and the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu. The studies are being made by an Assistant Professor of Physiology of the University's Pacific Biomedical Research Center. His present work is being done at the Honolulu Biological Laboratory's Kewalo Basin Docks, the only place in the world where living tuna are regularly available for research. There under a large circular tent are located the several pools where tuna are being used in pioneering experimental studies of behavior and physiology. The tent provides needed shade to the pools.

The University professor's research on living tuna suggests that the central dark muscle is responsible for one of the most characteristic behavioral traits of tuna--that is their ceaseless swimming. The Kewalo Basin Docks site has allowed Honolulu Laboratory scientists to document the fact that tuna never stop swimming, day or night. And although the fish is capable of bursts of considerable speed (20 miles an hour and perhaps much more), as a rule it swims quite slowly, at about 2 miles an hour. If it failed to do so, it would sink and suffocate.

This ceaseless swimming, which must begin soon after the tuna is hatched and lasts until it dies, is maintained almost exclusively by the red muscle, the professor believes. His method of documenting this is ingenious. He has constructed a plastic water-filled tank into which a tuna just fits. The fish is held gently in place by a rubber ring girdling its midsection. Oxygenated sea water flows through the gills (tuna obtain vital oxygen from the water by swimming with their mouths open, and the flowing water performs this

function for the experimental specimen. The fish's tail is free to beat in swimming movements. By sampling electrical activity from minute areas within the fish's muscles, the researcher is able to pinpoint accurately the muscle regions used in swimming movements. As a rule, these lie within the central red muscle. Only when the fish's flanks are touched and it begins to thrash about does the lighter muscle register electrical activity.

The lighter muscle thus offers the fish emergency power, which presumably is used in darting after prey or eluding predators. But it is power quickly spent. On the other hand, the dark muscle represents a source of low but constant energy. The difference resembles that between a pilot light and a flame hot enough to broil.

The professor's work casts doubt not on the biochemical evidence of the earlier investigations, but on the interpretation of it. There is no doubt that the chemical constitution of the dark muscle differs from that of the lighter. But contrary to earlier belief, the dark muscle does play a part, and it turns out to be a key part, in the muscular activity of the fish.

The professor working on the muscle study is one of three scientists using the Bureau's Honolulu Biological Laboratory's facilities to study aspects of tuna locomotion. The others are Assistant Professors of Zoology at the University of Hawaii. One of those scientists is interested in the hydrostatic aspects of tuna locomotion--how they maintain swimming depth. The other scientist is investigating oxygen consumption by the fish.

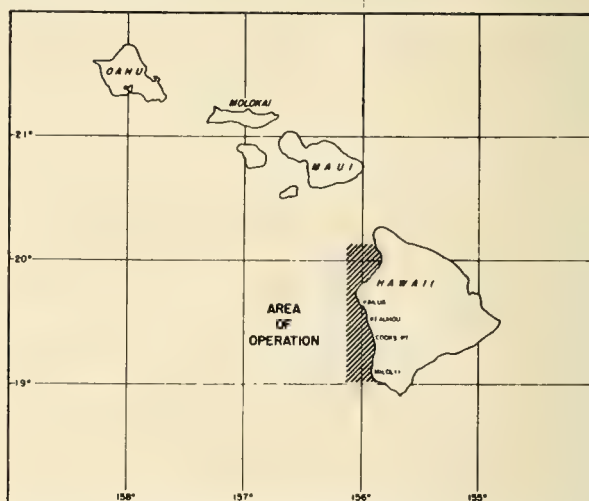
The scientist conducting the muscle study foresees the possibility that the three lines of approach will converge in the future, so that the scientists will be able to describe precisely how the tuna swims and how it affects its environment as it swims. His research is among the most sophisticated as yet performed on the skipjack tuna, "a species that before this has been largely inaccessible to experimental biologists," says one of the scientists working on tuna locomotion. The success of the electrophysiological experiments, in which the fish can be kept in a small tank for several hours, opens several new possibilities for research on tuna.

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MARINE LIFE BEHAVIOR AND RELATED BIOLOGICAL OBSERVATIONS:

M/V "Townsend Cromwell" Cruise 18
(July 25-August 27, 1965): Observations of the ecology and behavior of the marine-life community in the area of a drifting and anchored raft were among the several objectives of this cruise. The area in which the research vessel Townsend Cromwell of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii, operated during the cruise was within 10 miles off the west coast of Hawaii between latitude 19° and 20°10' N.

The observation raft was launched from the research vessel about 6 miles northwest of Milolii. From August 1-26, the raft drifted or was anchored off the west coast of Hawaii. During the cruise it was in the water a total of 466 hours; it was anchored for 266 hours, drifted for 168 hours, and was under tow by the vessel for 32 hours. Observations from the underwater chamber of the vessel during this phase of the cruise were made almost continuously except when the raft was being towed.



Area of operations during M/V Townsend Cromwell Cruise 18 (July 25-August 27, 1965).

Species observed around the raft were: skipjack tuna (Katsuwonus pelamis), yellowfin tuna (Thunnus albacares), dolphin (Coryphaena hippurus), triggerfish (Canthidermis maculatus), filefish (Alutera scripta), mackerel scad (Decapterus pinnulatus), jack (Seriola sp.), pilotfish (Naucratus ductor), driftfish (Psenes cyanophrys), man-of-war fish (Nomeus gronovii), rudderfish (Kyphosus cinerascens), damselfish (Abudefduf abdomi-

nalis), goatfish (Mulloidichthys auriflamma), barracuda (Sphyraena barracuda), marlin (Makaira ampla), and white tip shark (Carcharhinus longimanus). Schools of porpoise and pilot whales were also seen. About 2,800 feet of 16-mm. movies and numerous still pictures were taken.

Another objective of the cruise was to investigate the use of underwater sound as a method of influencing the behavior of tuna and other species.

Twelve days were spent in transmitting underwater sounds by J-9 transducers. Forty-six 1-hour periods of sound transmission were paired with 46 hours of silence. Sounds transmitted included swimming sounds made by schools of anchovy and miscellaneous sounds consisting of pure tones and sounds made by other marine animals.

During the 12-day period the large predators which appeared at the raft included yellowfin tuna, porpoise, pilot whales, and others, as well as smaller fish. There were no obvious overt reactions by any of those species to the transmitted sounds. The data were to be analyzed to determine if the fish were attracted to the raft by the sounds or displayed any subtle behavioral traits during the periods of sound transmission.

During this phase of the cruise, a continuous watch was maintained on a listening hydrophone. Recordings were made of the pulsed sounds which were transmitted for spectrographic analysis. No sounds attributable to fish were noted.

To investigate the use of food odor as a method of influencing the behavior of tuna and other marine life was another objective. During a 10-day experiment an odor made from squid (Loligo opalescens) was released from the anchored raft for 23 two-hour periods alternated with 23 two-hour periods during which no odor was released. Although skipjack tuna were sighted within $\frac{1}{2}$ mile of the raft, none came into the immediate vicinity during the odor experiments. There was no evidence that tuna or other fish species were initially attracted to the raft by the squid odor; excellent observations were made, however, which show that dolphins were able to detect the odor and could follow an odor gradient to its source from distances of about 65 feet.

Fish caught from around the raft were collected and preserved, and the stomach contents of 50 dolphins caught at the raft were recorded or preserved. Numerous fish were collected at the raft during night-light stations. These were brought back alive for further observation at the laboratory.

Numbered foam plastic sheets were released to obtain information on surface currents during the International Billfish Tournament. On July 26 they were released at 1-mile intervals from 1 to 5 miles west of Cook Pt., from 1 to 5 miles west of Keauhou and from 2 to 6 miles west of Kailua. The same release pattern was repeated on July 28. Ten drift cards were released with each plastic sheet. The sport-fishing fleet provided excellent assistance in the study of near-shore currents, by reporting sightings of the sheets from July 26 to 31. As a result it was possible to determine the current patterns. A pair of eddies were present offshore, with a band of easterly current between them. This onshore current split into north- and south-moving currents when it reached the coast. The location of the axis of the onshore current shifted a distance of about 15 miles southward during the week of the tournament.

Other operations during the cruise included a standard watch for fish, birds, and aquatic mammals, the usual series of bathythermograms, surface plankton tows, and collection of other oceanographic data.

Note: See Commercial Fisheries Review, June 1964 p. 12.

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SUBMARINE TESTED IN UNDERWATER RESEARCH:

M/V "Townsend Cromwell" Cruise 19 (September 16-October 17, 1965): The research vessel Townsend Cromwell and the Nenu II provided support facilities for the submarine Asherah during diving operations designed to aid in the Bureau's planning and development of a large research submarine. The Asherah is a small underwater craft leased by the Bureau's Honolulu Biological Laboratory for a 4-week period of research dives.

The Asherah made 50 dives in an area off Campbell Industrial Park near Barber's Point, Oahu. One was a shakedown dive, 19 were staff research orientation dives, and 30 had research and development as the principal objectives.

Portions of 8 dives by the Asherah were devoted to describing the plankton community and its migrations. Dives were made both day and night, and with and without artificial lights. Tuna forage organisms were enumerated and studied on portions of 13 dives, and tuna were encountered in 6 dives. These tuna, skipjack and little tuna, were encountered between 320 and 500 feet, usually in groups of 3 to 6 fish, but once in a school of 250 individuals, and another time associated with a school of 30 jack.

Tuna forage organisms consisted of four species of small fish, occurring in large schools between depths of 350 and 600 feet. Only one forage species was identified. Some schools of forage were estimated to contain as much as 300 "buckets" of bait-sized fish. Peculiar inverted circular swimming was noted for another kind of tuna forage, mackerel scad (*opelu*), on one occasion.

Two of the Asherah dives were devoted to evaluating the performance of plankton nets, and one to observing the path of fall of XBT's. None of the gear tests was particularly successful. A total of 17 dives was made for surveying the bottom, and additional information on the bottom and its resources was obtained in 10 other dives. Species lists were prepared for the depth range of 100 to 630 feet, including fish, corals (including red coral), lobsters, fish-cleaning stations, and other organisms and ecological situations.

Two dives involved measuring light attenuation by photographing plaques of known reflectance at different depths. Four dives were made to record the sounds produced by various soniferous animals. Among the sounds obtained were those of squirrelfish and triggerfish. On one dive the current was measured by suspending the submarine from a plastic float, whose drift was noted on the surface.

A diving log was kept for all dives made by the Asherah. Over 50 people participated in this cruise because of the large number of demonstrations made.

Note: See Commercial Fisheries Review, December 1965 p. 29.



Education

"SEA-GRANT" COLLEGES RECOMMENDED BY NATIONAL CONFERENCE AT UNIVERSITY OF RHODE ISLAND:

A proposal that the United States develop "sea-grant" colleges was endorsed at a 2-day meeting in Newport, Rhode Island, October 28-29, 1965. Meeting was attended by 230 scientists and educators representing all the important fishery States of the Pacific, Atlantic, and Gulf Coasts, as well as the Great Lakes.

The conference on "The Concept of a Sea-Grant University," sponsored by the University of Rhode Island and the Southern New England Marine Sciences Association, also recommended that Dr. Athelstan Spilhaus of the University of Minnesota, originator of the "sea-grant" idea, be given the opportunity to outline his ideas to "appropriate Government bodies."

Dr. Spilhaus opened the conference with a call for a national "man-in-the-sea" program. He said, "It is not necessary for us to occupy the ocean now, but if we don't someone else will. We can choose peaceful exploration and colonization of the sea and in doing this we are inventing the future." There is a gap, he said, between our scientists and those who use the sea, and this gap must be filled by ocean engineers. That is one of the reasons "sea-grant" colleges are needed.

The dean of the University of Rhode Island Graduate School of Oceanography announced that nine other scientists had agreed to work with him on a "National Sea-Grant University Committee." He will serve as secretary and the only officer of the group.

The conference also went on record as favoring in general principle the proposed sea-grant legislation (S. 2439) which has been introduced in Congress by Senator Claiborne Pell of Rhode Island. He has asked that 10 percent of the Government funds received from the lease of offshore lands be used to finance "sea-grant" colleges. It has been estimated this would amount to \$10 million or more a year. The bill is now before the Senate Labor and Public Welfare Committee. Hearings are expected to be held early in 1966. (University of Rhode Island, November 2, 1965.)



Federal Purchases of Fishery Products

DEFENSE DEPARTMENT REVISES INSPECTION CRITERIA FOR FOOD ESTABLISHMENTS:

DPSC Clauses 690a, b, and c effective November 22, 1965, set forth revised criteria for food establishments supplying perishable "brand name items or commercial equivalent items" to the Defense Department. One of the approved inspection criteria under those regulations is:

"A plant processing fish and other water-foods under the continuous inspection supervision of the Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, U. S. Department of Interior, in officially listed establishments for that service, provided further that each primary container shall be stamped or printed with: (i) the U. S. Grade stamp or shield; or (ii) the words: 'Packed by (firm's name) under continuous inspection of the Department of the Interior,' or 'Packed under continuous inspection of the Department of the Interior'; or (iii) a combination of (i) and (ii)."

DPSC Clauses 690 were set forth in Headquarters Notice No. 138 (65), issued by the Defense Personnel Support Center (DPSC), 2800 South 20th Street, Philadelphia, Pa. 19101. The revised regulations supersede MSSA Clauses 500 of May 9, 1960, which are obsolete.

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DEFENSE DEPARTMENT REVISES SUBSISTENCE CONTRACTOR INSPECTION PROCEDURES MANUAL:

On November 15, 1965, the Defense Department issued DSA-DPSC Manual 4155.5, Subsistence Contractor Inspection Procedures Manual. It sets forth procedures for the use and information of contractors who are responsible for product inspection in accordance with the requirements of Defense Personnel Support Center (DPSC) Subsistence contracts. The new manual supersedes the DSA - DSSC Contractor Inspection Procedures Manual 4155.1 dated September 3, 1963, and changes Paragraphs 1 to 7 thereof.

Even though current DPSC and DSSC Articles and Clauses may reference the superseded manual or its predecessors, the new manual will be used in all solicitations, and

their resultant contracts, issued on and after November 15, 1965.



Fisheries Laboratory

NEW GAME FISH RESEARCH LABORATORY FOR TEXAS GULF COAST:

The selection of Port Aransas, Tex., as the site for another Federal marine game fish research laboratory to be operated by the Bureau of Sport Fisheries and Wildlife was announced November 5, 1965, by Secretary of the Interior Stewart L. Udall.

The Port Aransas laboratory will cost about \$2 million to build and will be the latest in a system of centers authorized by Congress in 1959 to undertake a national research program on salt-water game fish. It will be used to study marine sport fishery resources in the Gulf of Mexico west of the Mississippi Delta.

Secretary Udall said the goal of such laboratories is to find answers needed to maintain and improve marine game fish resources through conservation and wise management. He said, "Salt-water fishing has become a major recreational pursuit of Americans, supporting a multi-million dollar segment of our economy. This new laboratory will make an important contribution by increasing knowledge of this recreational resource in the western Gulf."

Federal marine game fish laboratories already established are at Sandy Hook, N. J., Tiburon, Calif., and Narragansett, R. I. The site for a fifth laboratory at Panama City, Fla., was announced in October 1965.

Note: See Commercial Fisheries Review, December 1965 p.31.



Fur Seals

INTERIOR DEPARTMENT TO ISSUE NEW PROPOSALS FOR PROCESSING ALASKA SKINS:

A second invitation for research and development proposals to firms interested in experimental processing of Alaska fur seal skins will soon be issued by the U. S. Department of the Interior. The announcement will be made by Interior's Bureau of Com-

mercial Fisheries in response to interest expressed by processors who were unable to offer proposals earlier this year.

There are only sufficient raw seal skins available for a very limited number of research contracts. Firms submitting acceptable proposals, however, will be asked to process sample seal skins as a demonstration of their capability in performing more extensive research and development work.

The first invitation for research and development proposals was issued by the U. S. Bureau of Commercial Fisheries March 31, 1965, with a closing date of May 17 for filing of proposals. A one-year contract was then awarded the Pierre Laclede Fur Co., St. Louis, Mo., to develop new fur seal products and improved techniques for dressing, dyeing, and finishing the skins. Another invitation for proposals is now being considered by the Bureau.

Following the Alaska seal skin research and development program announcement, a five-year production contract for processing and selling seven-eighths of the seal skins harvested in the years 1963 to 1967 was awarded the Fouke Fur Company, Greenville, S. C. The contract was signed April 30, 1965. Secretary of the Interior Stewart L. Udall said then that one-eighth of the seal skins harvested during those years was being reserved for experimental contracts with interested and qualified fur-processing concerns.

Under the new contracts, all seal skins used in the research remain the property of the U. S. Government. Most of the skins eventually will be sold at auction, and it is anticipated that the proceeds will offset the cost of the research and development work.

The U. S. Bureau of Commercial Fisheries manages the Alaska fur seal herd, comprising some 1,500,000 animals, under provisions of the North Pacific Fur Seal Conservation Convention. Each summer when the herd congregates on the Pribilof Islands in the Bering Sea, the Bureau harvests from 50,000 to 80,000 surplus young animals on a sustained yield basis. Under the Convention terms, in return for abstaining from harvesting fur seals at sea, Canada and Japan each receive 15 percent of the annual Pribilof Islands harvest, as well as a proportionate share of the seal skins taken by the Sovi-

et Union on smaller rookeries off the Asian coast.

Note: See Commercial Fisheries Review, November 1965 p. 79.

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PRICES FOR ALASKA SKINS AT FALL 1965 AUCTION:

The fall auction in 1965 (October 14-15) of United States Government-owned fur seal skins (11,760 dressed, dyed, machined, and finished skins and 3,138 Lakoda skins) grossed \$1.41 million. The previous auction in the spring of 1965 grossed \$1.67 million for 13,729 processed dyed skins and 5,818 Lakoda skins. Average prices at the two auctions are not entirely comparable because in the fall 1965 auction males and females were sold in mixed lots of dressed, dyed, machined, and finished (DDM&F) skins whereas in the spring the males and females were sold separately. Since higher prices are paid for straight lots of male skins, the mixed lots command a lesser price. The smaller number of females in this sale prompted the decision to sell the skins in mixed lots.

At the fall auction, the overall average price for mixed lots of male and female dyed processed skins was \$103.78, or about 13 percent below the average price for male skins in the spring auction. A breakdown of the 3 colors within the (DDM&F) group of skins shows that the fall auction included the following: Black--3,834 male and 418 female skins yielding an average of \$109.74 per skin; Kitovi--1,246 male skins yielding an average of \$94.80; and Matara--4,810 male and 1,452 female skins yielding an average of \$101.35.

The mixed lots of Matara skins showed the greatest decline (17 percent) from the average price for male skins at the previous auction. A similar comparison shows the average price of mixed lots of Black skins down about 10 percent. The Kitovi skins sold in the fall were all males and their average price was down about 2 percent.

The Lakoda (female sheared) sales at the fall auction included 1,170 Natural skins at an average price of \$80.85 (up 30 percent from the spring auction); 1,484 Brown skins at an average price of \$42.93 (down 10 percent); and 494 Black skins at an average price of \$66.97 (up 33 percent).

Note: See Commercial Fisheries Review, June 1965 p. 21, Dec. 1964 p. 40.



Great Lakes

PUBLIC HEARING HELD ON PROPOSED CHANGES IN MICHIGAN'S YELLOW PERCH FISHING REGULATIONS:

Plans of the State of Michigan Conservation Department to liberalize commercial yellow perch fishing regulations for the entire Great Lakes were heard on October 27, 1965, in Tawas City, Mich., at a joint legislative public hearing held by the State's Senate and House Conservation Committees. The hearing was on the Department's proposal to remove size limits and closed seasons for taking yellow perch in 2½-inch mesh nets used by commercial operators.

The recommended changes, tentatively approved earlier by the Conservation Commission, are geared as much to promoting better sport fishing as they are to helping commercial fishermen. Fishery specialists of the Conservation Department say that the relaxed regulations are ultimately aimed at speeding the growth of perch. This would come about, they say, from increased commercial harvests which would trigger a rapid turnover in the Great Lakes yellow perch populations to produce better fishing for all concerned.

The Department's fishery chief points out that while the lifting of commercial size limits and closed seasons will give yellow perch populations a temporary boost, the long-range forecast for that Great Lakes species presents some uncertainties. He said, "Even if our efforts to introduce predatory game fish like the coho salmon are successful in cropping down nuisance species, we can still expect the alewife to put strong pressure on yellow perch. Eventually, the alewife's competition for food and space and its predation of fish eggs is going to mean a slump in perch numbers. The goal in seeking more liberal fishing regulations for commercial operators is to ease this situation by putting perch in a healthier condition to compete with alewife. This, at least, will slow down the perch decline we expect."

The October 27 hearing was the only one held in that part of the State to meet the legal requirement of publicly airing proposed commercial fishing changes. Another public hearing on the recommended measures may take place later elsewhere in Michigan. (*News Bulletin*, Michigan Department of Conservation, Lansing, October 21, 1965.)

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MICHIGAN POSTPONES PLAN TO INTRODUCE STRIPED BASS:

The State of Michigan Conservation Department has postponed its plans for planting striped bass in the lower Great Lakes during spring 1966 in order to concentrate on the introduction of coho salmon in northern streams. The State's Conservation Commission had previously approved the striped bass planting program but since then more has been learned about coho salmon which indicates that species may provide a bigger breakthrough in improving Great Lakes fishing than had been earlier thought.

The Department's fishery chief explained that "coho experts from the West, who ought to know, told us recently that we may have been underestimating the potential of this fish for making the grade in a big economic way in the Great Lakes." He said that the States of Washington and Oregon have in recent years come up with new techniques and information for raising, feeding, and planting coho salmon which have virtually revolutionized efforts for producing and increasing the survival of that species. He said this means that there is a much better chance of successfully introducing coho salmon in the Great Lakes than was previously realized. He added that striped bass plantings were not being discounted altogether and that in attempting to make Great Lakes fishing better, coho salmon seemed the more promising of the two species and that if it doesn't work, striped bass could be the possible "ace in the hole."

The Department fishery chief continued, "Our money, equipment, and personnel are thoroughly committed to the coho program and we don't want to water down this effort by shifting some of our attention at this time to a second species, namely the striper." He also said it is possible that the introduction of the striped bass could undercut the success of coho plantings and that in making a choice between those two species, consideration must be given to the coho because of its tremendous economic value, both to sport and to commercial fishing interests.

The key question in the Conservation Department's plans is whether the coho salmon, in the fresh waters of the Great Lakes will produce eggs that can be fertilized for hatching, naturally or artificially. Some idea about this will be gained during fall 1966 when the first runs of fast-maturing young male

coho salmon (called jacks) are expected to take place in Great Lakes streams. But the real answer won't come until the fall of 1967 when the first spawning runs are anticipated. After that, it should be known whether to stay with the coho or bring the striped bass into the picture.

Several other factors enter into the decision of Michigan to hold up the striped bass program. Among them is the matter of giving other Great Lakes states and the Province of Ontario time to complete their studies on that species. In the time it takes to check out the coho program, much can be accomplished in consolidating Michigan's studies with those of the other agencies before arriving at a definite decision on whether to attempt the introduction of striped bass, the Department head added. A delaying factor in the striped bass program is the lack of money to underwrite the effort. The Department chief and his staff estimate it would take \$100,000-200,000 during the first year to launch "striper" plantings which would have a reasonably good chance of being successful. (*News Bulletin*, Michigan Department of Conservation, Lansing, October 21, 1965.)

Note: See *Commercial Fisheries Review*, December 1965 p. 32.

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MICHIGAN STREAMS SELECTED FOR FIRST SILVER SALMON PLANTINGS:

The State of Michigan Conservation Department announced in November 1965 that three northern streams have been selected to receive about 750,000 silver or coho salmon during spring 1966 when the first plantings of that species will be made. The schedule calls for 250,000 of the 5-6 inch fish to go into the Platte River near Honor in Benzie County, 300,000 into Bear Creek near Bear Lake in Manistee County, and 200,000 in the Big Huron River northeast of L'Anse in Baraga County. Those fish, descendants of the Pacific Coast salmon, are expected to migrate downstream into Lakes Michigan and Superior, grow to maturity, and return to spawn in the streams where they are to be planted. Some of the faster-growing fish may attempt migrating back to their release sites during fall 1966. Results of the program will be known better in the fall of 1967 when the first general spawning runs are expected.

In selecting the three northern streams for initial releases, the Department's fish section chief said, "We were told that our

chances of having early success in this program should be best in these waters because the habitat requirements of steelheads and cohos are much the same." The Big Huron river was picked because it also offers a particularly good natural spawning area and provides some opportunity for taking eggs to help meet future rearing operations. It is considered very similar to western streams where silver spawning occurs.

In addition to being good steelhead waters, the Platte river and Bear Creek fit ideally into plans for later capturing spawners and collecting eggs from them. Also, with the two streams' release sites located near hatchery stations where silver salmon are being raised, transportation costs will be less.

Because Lake Michigan has such an abundant food supply for silver salmon--notably the alewife--the Department has planned its first-year planting program to putting about three-quarters of its silver salmon stock into the northern Lower Peninsula streams. The other one-quarter has been reserved for the Big Huron River to take advantage of the lower degree of competition the coho will face from other fish in Lake Superior.

Besides selecting the most promising streams for first releases, the Department planned another step aimed at giving its program a successful start. This was increasing the iodine content of hatchery water supplies for silver salmon. Experience on the West Coast, where silver salmon waters are rich in iodine, shows that this mineral is a key factor in the production of fertile silver salmon eggs. It is hoped that the fortified water supplies of hatcheries will tide the fish over after they reach the Great Lakes which are deficient in iodine.

With plans taking more solid shape for the initial release of that salmon species this coming spring, the Michigan Conservation Department was notified that the State of Oregon would meet Michigan's request for 1.2 million silver salmon eggs. The first shipment of about 600,000 eggs was scheduled to be flown into Pellston, Mich., about late November. Most of those eggs and the remaining 600,000 expected to reach Michigan shortly thereafter were to be taken to the State's Oden hatchery. Some also were to go to the State's Harrietta and Thompson hatcheries in northern Michigan. Before the end of 1966, another 50,000 silver salmon

eggs of specially adaptable strains were expected to be delivered from Alaska. Also included in Michigan's planting program for 1967 is the anticipated delivery of 1.2 million silver salmon eggs from the State of Washington. (News Bulletin, Michigan Department of Conservation, Lansing, November 11, 1965.)
Note: See Commercial Fisheries Review, April 1965 p. 21.



Great Lakes Fisheries Explorations and Gear Development

LAKE SUPERIOR TRAWLING STUDIES CONTINUED:

M/V "Kaho" Cruise 29 (September 9-October 14, 1965): A 36-day exploratory fishing cruise in Lake Superior was completed October 14, 1965, by the U.S. Bureau of Commercial Fisheries research vessel Kaho. The cruise, covering the entire south shore, was the sixth exploration undertaken for the purpose of determining the potential for developing more effective and efficient methods for catching Lake Superior fish. The work is part of the Bureau's technical assistance program designed to help the Lake Superior commercial fishing industry overcome problems related to changing fish populations and resulting economic setbacks.

Primary objectives of the cruise were to: (1) determine the availability of various species of fish to bottom trawls, (2) locate additional areas suitable for bottom trawling, and (3) study vertical and horizontal distribution patterns of fish concentrations. Other objectives were to: collect fish and bottom samples for botulism and pesticide studies; collect sculpin, chub, and smelt samples for technological studies; and collect longnose sucker for biological studies. Records were kept of fin-clipped lake trout caught, and studies were continued on trout-releasing techniques. A length-weight composition study of chub was also undertaken.

Chub accounted for 53 percent of the 14,079 pounds of fish taken during the cruise; smelt accounted for 19 percent of the total catch, sucker 18 percent, lake trout 3 percent, and other species 7 percent. Trawling in depths of less than 35 fathoms yielded a catch that was about equally divided between chub, smelt, and sucker. But chub made up 84 percent of the catch taken from depths of over 35 fathoms.

Cruise highlights included the continued success of trawling for chubs at various locations along the south shore. Catch rates for chubs were generally lower than those in several previous explorations, possibly as a result of stormy weather experienced during the October cruise. A 1,200-pound catch of smelt, of which 25 percent were jumbo (6-7 fish a pound), was taken in Huron Bay. Another outstanding catch of over 1,250 pounds that included 900 pounds of longnose sucker and 250 pounds of chub was taken in a drag off Black River. A total of 28 trawl-fishing stations was established west of the Keweenaw Peninsula in addition to those located during initial operations in that area in June 1965. In setting up the new stations, depth-series evaluations were made at 7 to 60 fathoms off Ontonagon; 22 to 50 fathoms off Little Girls Point; 25 to 50 fathoms off the Brule River; and 4 to 40 fathoms off Duluth, Minn.

As on previous cruises, chub production was highest at 35-45 fathoms while trout catches were highest at 20-30 fathoms. During the October cruise, the highest average chub catch rate (on a lake-wide basis) of 217 pounds per 30-minute drag was obtained at 40 fathoms. At that depth, the average trout catch was 3 pounds (5 fish) per 30-minute drag. In shallower water, chub catches decreased while trout catches increased (75 percent of the total pounds of trout landed during the cruise was taken in water shallower than 35 fathoms). Chub catches in the eastern half of the lake were slightly higher than those west of the Keweenaw Peninsula. The best individual chub catches were 950 pounds taken at 40 fathoms in Shelter Bay and 525 pounds taken at 35 fathoms off Eagle Island north of Cornucopia. Smelt were most concentrated in 15-20 fathoms; in all drags at those depths smelt catches averaged 100 pounds per half-hour. West of the Keweenaw Peninsula, longnose sucker contributed significantly to the catch, with the largest landings (190-900 pounds) from between 30-40 fathoms.

FISHING OPERATIONS: A total of 91 drags made during the Cruise with a 52-foot (head-rope) Gulf of Mexico-type fish trawl. Forty-eight drags were conducted between Whitefish Bay and the Keweenaw Peninsula and 43 from the Keweenaw Peninsula west to Duluth. All drags were of 30-minute duration, except 12 which were terminated early due to encounters with snags, rough bottom conditions, or the presence of set-fishing gear. Three oth-

er drags were ended early because small lake trout were known to be in certain shoal waters. Snags resulting in major gear damage occurred during 2 drags and minor damage was caused by snags in 4 other drags; 22 drags involved encounters with logs, 6 of which caused major trawl damage and 14 of which caused minor damage.

FISHING RESULTS (Whitefish Bay to Keweenaw Peninsula): Chub catches in the Whitefish Bay to Munising area were light compared to previous explorations in that area; 17 drags produced a total of only 325 pounds, 40 percent of which was chub. Stormy weather probably accounted for the decline.

Except for one 950-pound catch made at 40 fathoms north of Shelter Bay, chub catches in the Minising Bay to Huron Bay region were also light and amounted to only 40 percent of the total catch of slightly over 3,200 pounds for all species in 14 drags.

In the Keweenaw Bay to Bete Grise Bay area, 17 drags produced a total of 1,240 pounds of chub--nearly 60 percent of the total catch of almost 2,100 pounds for all species. The best catches of chubs, 245 to 430 pounds a drag, were obtained at 35 to 40 fathoms off Grand Traverse and Bete Grise Bays. Due to the presence of set-fishing gear in that area it was not possible to monitor stations where high production rates of chub had occurred during previous explorations by the Kaho. In Keweenaw Bay, major gear damage occurred in 6 of 11 drags as a result of picking up large logs in the trawls.

Two catches of common whitefish, 60 and 180 pounds a drag, were taken at 10 and 35 fathoms in Munising Bay. Smelt catches of 100 pounds and over were taken at 15 fathoms in Huron Bay and between 20 and 30 fathoms in Keweenaw Bay. The best smelt catch, 1,200 pounds, was obtained in 15 fathoms in Huron Bay; 25 percent of that catch were jumbofish (6-7 fish per pound). Catches of lake trout amounted to a total of 189 pounds for all drags and 85 percent of the trout catches (161 pounds) occurred in depths of 35 fathoms and under. Two drags in Keweenaw and Huron Bay at 30 fathoms produced 14 cisco weighing 28 pounds. Suckers in amounts of over 100 pounds a drag were caught at 15 and 20 fathoms in Huron Bay and Keweenaw Bay, respectively. Catches of other species were insignificant.

FISHING RESULTS (Houghton to Duluth): In this area, echo-soundings showed that the largest concentrations of fish were off the bottom. That was probably due to an extended period of adverse weather. From Houghton to Duluth, chub were the most abundant species caught, followed by sucker and smelt. The depth distribution of chub varied within the area. From Ontonagon to Bayfield, the best catches (325 and 350 pounds) were made in 40 fathoms. In the Apostle Islands area, 300 pounds were taken in the South Channel of Madeline Island at 22 fathoms. From Cornucopia to Duluth the best catches (from 250-525 pounds) were made in 30 to 35 fathoms. The best individual landing of 525 pounds was taken from 35 fathoms off Eagle Island.

Lake trout concentrations were noted only at 30 fathoms off the Porcupine Mountains where 60 trout (45 pounds) were landed and at 22 fathoms off Madeline Island where 166 trout (60 pounds) were taken. Only 22 trout totaling 12 pounds were taken in the 18 drags from Cornucopia to Duluth. The break-off depth for trout west of the Keweenaw Peninsula was at the 35-fathom level, with 84 percent of the total trout landings made in shallower water.

Good catches of sucker were made with regularity from Ontonagon to Duluth. Six drags produced over 100 pounds and the best catch was 900 pounds. Sucker appeared at all depths from 4 to 40 fathoms with good individual catches occurring throughout that range. An average of 62 pounds a drag was obtained in 35 drags made in depths of 40 fathoms or shallower. Of the sucker catch, 81 percent by weight were longnose, the rest were common.

Smelt were generally scattered with the heaviest concentrations found at about 15 to 20 fathoms. Off Duluth, the best smelt catches were 225 pounds taken in 20 fathoms and 150 pounds from 4 fathoms. Another fair catch of 75 pounds was taken at 22 fathoms off Little Girls Point. An average of 30 pounds of burbot occurred in 75 percent of the drags west of the Keweenaw Peninsula. Catches of cisco and whitefish were minimal. Alewives occurred in only 4 drags at an average rate of only two pounds. An outstanding catch containing over 200 young-of-the-year yellow pike or walleye was made at 4 fathoms off Duluth.

HYDROGRAPHIC DATA: Thermal gradients were recorded with bathythermograph and continuous surface-temperature recorder instruments. Bottom temperatures ranged from 39° to 55° F. and surface temperatures ranged from 48° to 58° F.

Note: See Commercial Fisheries Review, Nov. 1965 p. 20, Sept. 1965 p. 25.



Great Lakes Fishery Investigations

BIOLOGICAL RESEARCH AND SEA LAMPREY CONTROL, OCTOBER 1965:

Some of the highlights of Great Lakes biological research by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich., during October 1965:

Lake Superior: The spawning stocks of lake trout in the Apostle Islands region of Lake Superior were sampled during October 1965. Large-mesh gill nets (4½- to 6-inch mesh) fished on Gull Island shoal yielded 683 spawning lake trout of which 74 were females. Forty-five (6.6 percent) of the spawners were fin-clipped. Catches included 30 recaptures which had been tagged and released on the shoal in former years. The catch per unit of effort was nearly the same as that in 1964, the highest recorded since the collection of records began in 1951. The lake trout ranged from 20.5 to 33.5 inches (average, 27.0 inches) long. Only one fish had a fresh lamprey wound; old scars were present on 49 percent of the lake trout.

Small-mesh gill nets (1½- and 2½-inch mesh) fished on Gull Island shoal yielded longnose suckers, round whitefish, lake herring, and lake northern chubs. Several stomachs were examined of each species and lake trout eggs were found only in the stomach of one longnose sucker. Several trawl hauls made off Outer Island and Cat Island did not yield any young-of-the-year lake trout.

Lake Erie: Commercial fish landings along the entire south shore of Lake Erie, Saginaw Bay, and Green Bay were sampled during October 1965. Experimental trawling with the U. S. Bureau of Commercial Fisheries research vessel Musky II was unproductive on the sampling grounds when the fish moved into deeper areas of the lake because of unusually early cooling of the water.

Lake Michigan: In the program on the interrelationships of the alewife with native

species in Lake Michigan, studies on food preferences were continued by the Bureau's laboratory staff. Additional information was developed on the changes in growth, length, and weight of bloaters in Lake Michigan.

Sea Lamprey Control and Research: Chemical treatment of streams ended on Lake Superior with the completion of 3 river systems (Gratiot, Huron, and Buck Bay Creek). Treatment operations on Lake Michigan also ended for the season when 4 tributaries of the St. Joseph River were treated by the end of October. Bioassay ranges in those southern streams were high, ranging from 11.0-29.0 ppm.

The tagging of parasitic-phase sea lampreys has been intensified by the Bureau and the Fisheries Research Board of Canada has joined in the operation. Through October 31, 1965, a total of 1,003 sea lampreys had been tagged. Tags were recovered by commercial fishermen from 46 of the sea lampreys tagged during fall 1965.

Fyke nets were fished in 10 streams tributary to Lake Superior and 5 streams in northern Green Bay.

The experimental population of sea lamprey larvae in the Big Garlic River produced its first parasitic-phase lampreys. Two were taken at the incline trap during October.



Gulf Fisheries Explorations and Gear Development

SHRIMP GEAR STUDIES CONTINUED:

M/V "George M. Bowers" Cruise 62 (October 11-November 5, 1965): A 26-day exploratory cruise in the northeastern and north central Gulf of Mexico by the U. S. Bureau of Commercial Fisheries research vessel George M. Bowers was completed on November 6, 1965. Original purpose of the cruise was to photograph bottom trawling conditions and marine life on the royal-red shrimp grounds of the north central Gulf. This was to be in preparation for working on those grounds with a modified deepwater electric shrimp trawl, and also for additions to the Atlas of Gulf Bottom Conditions being compiled by the Bureau.

Because of mechanical failures of camera and winch in deep water, complete objectives were not attained. The vessel spent the latter part of the cruise searching for an area of shallow water shrimp concentrations adequate for commercial testing of the electrical shrimp trawl. Shallow water shrimp stocks were found to be light and not adequate at that time in the north central or northeastern Gulf for commercial testing of the electrical trawl alongside conventional trawls.

Note: See Commercial Fisheries Review, December 1965 p. 33.



Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-34 (October 28-31, 1965): White shrimp were predominant in the catches made during this cruise by the research vessel Gus III chartered by the U. S. Bureau of Commercial Fisheries. As part of a continuing Gulf of Mexico shrimp distribution study, 3 statistical areas were covered and 11 standard 3-hour tows with a 45-foot flat trawl were made. Other operations included 23 plankton tows, 5 dredge hauls, 19 bathythermograph (BT), and 162 water (Nansen bottle) casts.

The largest catches of white shrimp made on the cruise were in area 13. The up to 10-fathom depth of that area yielded 61 pounds of 21-25 count white shrimp, and 17 pounds of 15-20 count were taken in the 11-20 fathom depth. The three depth ranges worked in that area yielded only very small quantities of small brown shrimp.

Area 14 yielded 43 pounds of 26-30 count brown shrimp from the over 20-fathom depth. Other depths in that area were mostly unproductive and accounted for only a scattering of brown and white shrimp.

Large brown shrimp (9 pounds of 12-15 count) were caught in the over 20-fathom depth of area 16. Hauls from the other two depths yielded nothing.

Note: See Commercial Fisheries Review, December 1965 p. 33.



Gulf States

FISHERY LANDINGS, 1964:

Fish and shellfish landings during 1964 in the Gulf States (west coast of Florida, Alabama, Mississippi, Louisiana, and Texas) amounted to 1.3 billion pounds valued at a record \$99.3 million ex-vessel. This was a decline from the previous year of about 82 million pounds, but an increase of \$508,000.



Medium trawler at the dock in Westwego, La.

The lower quantity in 1964 resulted chiefly from a marked decline in landings of menhaden (904 million pounds)--down 64 million, and shrimp (179 million pounds)--down 24 million. Smaller losses occurred in landings of hard blue crabs and oysters. The principal increase was in landings of unclassified species used for bait, reduction, and animal food (87 million pounds)--a gain of more than 6 million pounds as compared with 1963. Landings of red snapper (13.3 million pounds) were slightly greater than the previous year, and only 300,000 pounds less than the record production of 1902.

Three States (Louisiana, Mississippi, and Texas) accounted for 1.2 billion pounds (89 percent) of the total quantity; while Louisiana, Texas, and the west coast of Florida accounted for \$87 million (88 percent) of the value.

In 1964, there were 25,171 fishermen engaged in the Gulf fishery--688 more than in the previous year. Commercial fishing craft operating in those States during 1964 consisted of 3,582 vessels of 5 net tons and over, 10,149 motor boats, and 595 other boats.

Hawaii

FISHERY LANDINGS, 1964:

Commercial landings of fish and shellfish in the State of Hawaii in 1964 were 12.7 million pounds valued at ex-vessel \$2.8 million. Compared with 1963, this was a gain of about 1.0 million pounds (8 percent) and \$168,500 (6 percent).



Hawaiian sampan fishing skipjack tuna.

The increase in both quantity and value of the 1964 catch resulted principally from greater landings of skipjack (9.0 million pounds--up 924,000) and yellowfin tuna (500,000 pounds--up 115,000). Other species showing production gains were striped marlin, jack crevalle, and bigeye scad. There were slight declines in landings of big-eyed tuna, dolphin, and jack mackerel.

Oahu led the islands in landings with 10 million pounds--80 percent of the total. The Island of Hawaii was next with 1.6 million pounds, followed by Maui with 712,000 pounds. The remainder of the catch was landed in the Islands of Kauai, Molokai, and Lanai.

The 1964 catch was taken by 743 fishermen--77 less than in 1963. Fishing craft operated during the year included 57 vessels of 5 net tons and over, 350 motor boats, and 24 other boats.

Note: See Commercial Fisheries Review, June 1964 p. 16.



Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-September 1965: Based on domestic production and imports, the United States available supply of fish meal for the first 9 months in 1965 amounted to 445,878 short tons--108,217 tons (or 19.5 percent) less than during the same period in 1964. Domestic production was 1,460 tons (or 0.7 percent) less, and imports were 106,757 tons (or 30.0 percent) lower than in January-September 1964. Peru continued to lead other countries with shipments of 204,345 tons.

U. S. Supply of Fish Meal and Solubles, January-September 1965			
Item	Jan.-Sept.		Total 1964
	1/1965	1964	
	. . . (Short Tons) . .		
Fish Meal and Scrap:			
Domestic production:			
Menhaden.....	150,690	143,455	160,349
Tuna and mackerel	19,674	15,493	21,113
Herring	11,118	7,744	8,881
Other	15,236	31,486	44,909
Total production	196,718	198,178	235,252
Imports:			
Canada	32,623	42,819	54,769
Peru	204,345	285,770	348,025
Chile	5,132	11,302	12,942
Norway	49	-	-
So. Africa Rep.	2,900	13,087	18,581
Other countries	4,111	2,939	4,826
Total imports.	249,160	355,917	439,143
Available fish meal supply ...	445,878	554,095	674,395
Fish Solubles:			
Domestic production 2/	80,082	81,655	93,296
Imports:			
Canada	1,253	1,226	1,553
So. Africa Rep.	-	935	987
Other countries	2,504	1,735	1,965
Total imports	3,757	3,896	4,505
Available fish solubles supply	83,839	85,551	97,801
1/Preliminary.			
2/50-percent solids.			

The United States supply of fish solubles during January-September 1965 amounted to 83,839 tons--a decrease of 2.0 percent as compared with the same period in 1964. Domestic production dropped 1.9 percent and imports of fish solubles decreased 3.6 percent.

* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES:

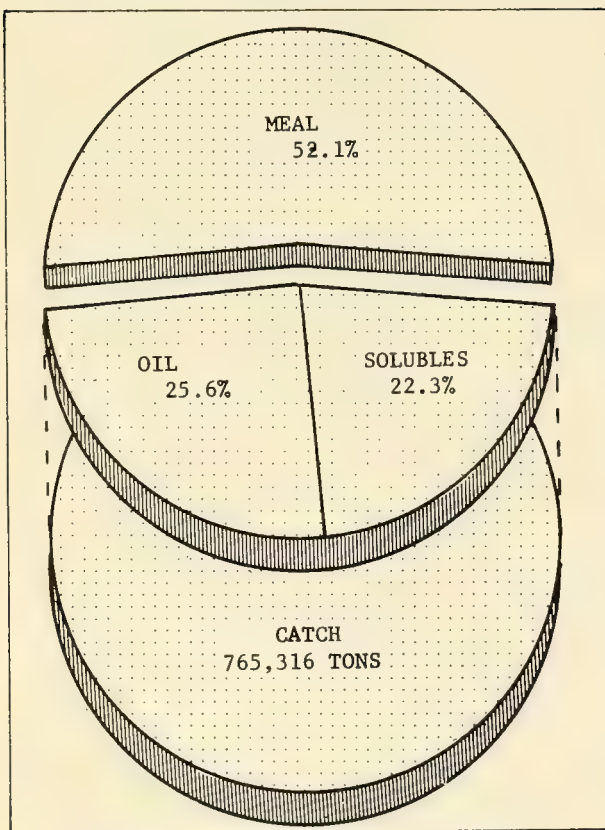
Production, September 1965: During September 1965, a total of 19,637 tons of fish meal and about 17.7 million pounds of marine-animal oil was produced in the United States. Compared with September 1964 this was a decrease of 3,181 tons of fish meal and 2.1

U.S. Production of Fish Meal, Oil, and Solubles, September 1965 1/ with Comparisons				
Product	Sept.		Jan.-Sept.	
	1/1965	1964	1/1965	1964
..... (Short Tons)				
Fish Meal and Scrap:				
Herring	1,464	646	11,118	7,744
Menhaden 2/	14,659	18,034	150,690	143,455
Tuna and mackerel	2,511	2,463	19,674	15,493
Unclassified	1,003	1,675	15,236	31,486
Total	3/19,637	3/22,818	3/196,718	3/198,178
Fish solubles:				
Menhaden	7,403	7,764	64,535	62,070
Other	1,632	2,184	15,547	19,585
Total	9,035	9,948	80,082	81,655
..... (1,000 Pounds)				
Oil, body:				
Herring	884	343	7,009	9,536
Menhaden 2/	15,793	18,073	155,552	140,911
Tuna and mackerel	570	583	3,506	3,422
Other (inc. whale)	416	781	4,180	6,677
Total oil	17,663	19,780	170,247	160,546

1/ Preliminary data.

2/ Includes a small quantity of thread herring.

3/ Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.



U. S. menhaden catch and products, 1964.

million pounds of marine-animal oil. Fish solubles production amounted to 9,035 tons--

a decrease of 913 tons as compared with September 1964.



Inland Fisheries Explorations and Gear Development

OAHE RESERVOIR TRAWLING STUDIES:

Reservoir Research Vessel "Hiodon"
Cruise 4 (September 1965): To (1) find areas for effective bottom trawling and (2) collect catch and biological data were the main objectives of this cruise in Oahe Reservoir located in South and North Dakota. This trawling operation by reservoir fishery research vessel Hiodon of the U. S. Bureau of Commercial Fisheries was carried out in Zones 1 and 3 (reservoir miles 8 and 63) during September 8-10 and in Zone 6 (reservoir miles 122-123) on September 15, 21, and 24, 1965.

FISHING OPERATIONS: A 52-foot trawl was used to make seven 15-minute drags in Zones 1 and 3, and 18 drags in Zone 6. All drags were made over inundated flats at depths ranging from 24 to 90 feet.

FISHING RESULTS: Zones 1 and 3: Seven drags in the lower reservoir caught 3,280 fish (age group II or older) that weighed a total of 1,315 pounds, for an average of 469 fish or 188 pounds per drag. Carp and yellow perch combined made up 94.6 percent of the catch by number and 86.6 percent by weight. About 75 percent of the carp were small and averaged 14.7 inches and 1.5 pounds, whereas larger carp averaged about 22 inches and 3.2 pounds. Perch averaged slightly over 0.1 pound and were in the 6-inch class.

Goldeye was the only other species taken in substantial numbers and made up 3.8 percent of the catch by number and 8.6 percent by weight.

The most productive drag took 1,658 fish that weighed 563 pounds and consisted primarily of carp (125 fish or 306 pounds) and perch (1,516 fish or 224 pounds).

Yearling fish taken were 4 sauger and one each of yellow pike or walleye, black bullhead, and channel catfish.

Young-of-the-year fish were taken in 5 of the 7 drags. The young-of-the-year catch consisted of 291 white bass, 3 northern pike, 3 white crappie, 1 drum, and 1 channel catfish.

Zone 6: The 18 drags in Zone 6 caught 2,031 fish, age group II or older, that weighed a total of 2,462 pounds, for an average of 113 fish or 137 pounds per drag. The dominant species taken was carp (53.2 percent by number and 73.5 percent by weight). The catch of carp was made up of 96 percent small fish (age groups II and III) and 4 percent large fish (age group IV and older). The average weight of small carp was 1.6 pounds and of large carp 3.9 pounds.

The most productive drag in Zone 6 produced 223 fish that weighed 335 pounds. Carp comprised 87 percent by weight of the fish taken in that drag.

The catch of 615 yearling fish in Zone 6 was dominated by goldeye (408 fish) and crappie (108 fish). Other yearlings taken were 36 channel catfish, 30 white bass, 16 sauger, 8 drum, 5 northern pike, 2 carpsucker, 1 white sucker, and 1 carp.

Young-of-the-year fish were taken in all drags in Zone 6. Crappie and white bass dominated the young catch. Of 1,683 young-of-the-year taken, crappie (white and black combined) made up 75 percent and white bass 20 percent. Other young taken included carp, goldeye, sauger, black bullhead, drum, big-mouth buffalo, and perch.

Note: See Commercial Fisheries Review, Dec. 1965 p. 37, Nov. 1965 p. 24.



Inventions

NEW FISHERY PROCESSING METHODS PATENTED:

Following are brief descriptions of patented devices and methods for processing fishery products, as reported in Food Technology, September 1965:

Scallop Evisceration: L. C. Renfroe issued U. S. Patent No. 3,177,522, April 13, 1965: Automated apparatus for severing the viscera of scallops in a manner to permit the scallop muscle to rotate about its own axis when the viscera attached to the muscle

is engaged by the leading edge of a cutting element.

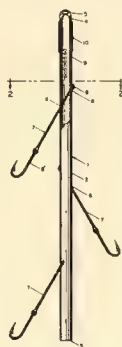
Shrimp Deveining: T. S. Gorton, Jr., Riverside Inc., issued U. S. Patent No. 3,178,765, April 20, 1965: A hand instrument for deveining and removing the shells of shrimp.

Tuna Packer: E. H. Carruthers issued U. S. Patent No. 3,181,957, May 4, 1965: A fish-packing method in which fish loins of the required weight for a single container are broken into pieces and reformed into a chunk pack by pressure, thus retaining their chunk appearance.

Fish Processing: S. H. Lassen, Ralston Purina Co., issued U. S. Patent No. 3,180,738, April 27, 1965: Cooked tuna-like fish are cooled preparatory to canning in an atmosphere of inert gas.

NEW FISHING TACKLE DEVICE PATENTED:

The inventor of a new fishing tackle device describes it as a multibait device that is not easily tangled and which is especially useful to keep live bait separated but active while fishing. Includes a (colored) translucent plastic tubular body having a number of leaders with hooks extending transversely--thereby eliminating separate floats, weights, and swivels, yet retaining their general functions. It has a simple device by which varying amounts of air may be trapped in the tubular body to vary the buoyancy of the device and keep it upright in the water. Since the bait, hooks, and tubular body are thus compactly arranged at the end of the fishing line, the device may be easily cast and successfully used even by inexperienced fishermen. (Pat. No. 3,183,620 granted Emil J. Dockal, 8606 Kellett, Houston, Tex. 77028.)



Marketing

EDIBLE FISHERY PRODUCTS, JANUARY-AUGUST 1965 AND OUTLOOK FOR 1966:

Total supplies in the United States of edible fishery products during the first 8



Attractive fresh fish display.

months of 1965 were just above those of a year earlier. The status of frozen stocks changed only little. But landings of major edible species ran about 3 percent below 1964, with haddock, salmon, tuna, Pacific mackerel, and ocean perch landings well below the previous year. Shrimp was the only major species with a considerable gain.

The lower landings during the period were offset by a 7-percent increase in imports of edible fish, due mainly to a large increase in frozen fish blocks and slabs and frozen shrimp. At the beginning of 1965, it appeared that a shortage of fish blocks might cut down production of fish sticks and portions. United States imports of frozen fish blocks increased during the 8-month period and supplies were expected to be ample at the start of the new year.

The small increase in fishery products supplies is not keeping pace with population growth. United States per capita consumption of fishery products in 1965 was about 10.5 pounds compared with 10.6 pounds in 1964. Consumption of fresh and frozen fishery products was estimated at 5.8 pounds per capita, down from 5.9 pounds; for canned fishery products it was unchanged at 4.2 pounds, and also unchanged for cured products at 0.5 pound.

With slightly lower fishery products supplies per capita and increased prices of competing products, retail prices for fishery products as of November 1965 averaged above a year earlier. Prices strengthened in the fourth quarter of 1964 and continued an upward trend in the first 3 quarters of 1965. Prices in 1965 averaged above 1964 by about 3 percent, halting a 2-year downward trend.

No appreciable change in United States supplies is expected for 1966, although some increase appears likely. High prices in 1965 may stimulate a little more fishing effort by the fishing fleet. Higher prices, however, are more likely to result in increased imports.

Note: This analysis was prepared by the Bureau of Commercial Fisheries, U. S. Department of the Interior, and published in the U.S. Department of Agriculture's November 1965 issue of the National Food Situation (NFS-114).



North Atlantic

SOVIET FISHING ACTIVITY OFF COAST, NOVEMBER 1965:

Soviet fishing activity in the North Atlantic during November 1965 declined to its lowest level since the beginning of 1965. It was estimated that the total number of vessels during the month did not exceed 25. Of those, 16 were identified as 12 fish-factory stern trawlers, 3 processing and refrigerated-factory stern trawlers, and 1 refrigerated fish transport. This compared with 74 vessels sighted in October of this year and 26 in November 1964.

The observations were made by the staff of the Fisheries Resource Management Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., which conducts weekly reconnaissance flights cooperatively with the U. S. Coast Guard. Weekly sightings to about mid-November averaged about 5 vessels; by the end of the month they rose to 20 vessels.

Their fishing operations were widely scattered over a 50-mile area from the Cultivator Shoals to the "southeast part" of Georges



Fig. 1 - Rumanian factory stern trawler Constanta on Georges Bank during October 1965.

Bank, 60 miles east to 140 miles southeast of Cape Cod, at depths of 30 to 50 fathoms. Despite gale force winds which prevailed during most of November, the majority of vessels were actively engaged in fishing operations, with the moderate to small catches observed on deck mostly whiting. Because of the limited number of vessels scattered over the banks it was presumed they were acting as scout vessels in search of fish concentrations.



Fig. 2 - Polish factory stern trawler Finwal was fishing on Georges Bank in October 1965.

The decrease in Soviet fishing activity in November was not limited to Georges Bank only. A gradual decline in activity off the eastern Nova Scotian areas was also observed during the month.

Note: See Commercial Fisheries Review, December 1965 p. 40.



North Atlantic Fisheries Investigations

LOBSTER AND SEA HERRING POPULATION STUDIES CONTINUED:

M/V "Delaware" Cruise 65-12 (Lobster Investigations, October 28-November 2; Her-

ring Investigations, November 3-8, 1965): To sample lobster and sea herring populations in the North Atlantic Ocean (Hudson Canyon, southeast part and northern part of Georges Bank) was the principal objective of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Delaware. Other objectives were to: (1) obtain related environmental data, (2) obtain lobster and herring blood samples, and (3) make plankton tows for lobster and herring larvae.

FISHING OPERATIONS: Lobster: Six trawl sets made at the station worked in waters of 45 fathoms yielded 140 lobsters--77 females (6 berried) and 63 males. Two lobsters (males) were soft-shelled. The average weight of the lobsters was $1\frac{1}{2}$ pounds and the range in weight was from $\frac{1}{3}$ to $6\frac{1}{2}$ pounds. A total of 25 lobster blood samples was obtained for analysis.

Herring: Seven herring trawl sets were made at stations covered. The sets made in waters of 40 to 62 fathoms yielded a total of 12 bushels (about 850 pounds) of herring ranging from 24.5 to 33.2 centimeters (about 9.6 to 13.0 inches) long. The 1960 year-class was dominant in the herring catches, followed in percentage occurrence by the 1961 year-class. Examination showed that the majority of the herring had spawned. A total of 30 blood samples was obtained for analysis. Other species of fish caught during the cruise were: haddock (23 bushels), hake (14 bushels), pollock (2 bushels), cod ($1\frac{1}{2}$ bushels), anglerfish (1 bushel), whiting ($\frac{1}{2}$ bushel), butterfish ($\frac{1}{2}$ bushel), lemon sole ($\frac{1}{4}$ bushel), dab ($\frac{1}{4}$ bushel), and 1 halibut.

PLANKTON OPERATIONS: Lobster: One 1-meter net plankton tow lasting 15 minutes (at the surface) was made during the cruise but no lobster larvae were obtained. **Herring:** Fourteen 1-meter net plankton tows lasting 15 minutes each (5 minutes at 10 meters, 5 minutes at 5 meters, and 5 minutes at the surface) were made during the cruise. Herring larvae with an average length of 19 millimeters (0.7 inches, range 0.4 to 1.1 inches) totaled 72.

HYDROGRAPHIC OBSERVATIONS: Sea-bed drifters and drift bottles were released at various stations and at each hydrographic station bathythermograph (BT) casts were made, surface salinities collected, and weather observations recorded.

Note: See Commercial Fisheries Review, December 1965 p. 41.

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FALL DISTRIBUTION OF LARVAL HERRING IN GULF OF MAINE STUDIED:

M/V "Rorqual" Cruise R-6-65 and R-7-65 (October 20-28 and November 1-10, 1965):

To determine the fall distribution and relative abundance of larval herring in the Gulf of Maine and to examine their microdistribution with special emphasis on dispersion was the objective of this cruise by the U. S. Bureau of Commercial Fisheries research vessel Rorqual. The area where the vessel operated was from Cape Ann to Grand Manan Channel and inshore within Casco Bay, Sheepscot and Damariscotta estuaries.

BIOLOGICAL OBSERVATIONS: Oblique tows with a Gulf III sampler were made from the surface to 20 meters (65.6 feet) at most of the stations worked. At a number of stations, tows were made at the surface, mid-depth, and bottom. Four transects of the standard tow of 3 miles were run--2 with the BB #1 trawl equipped with a fine-mesh liner and 2 with the Gulf III sampler. Each 3-mile tow was repeated as two $1\frac{1}{2}$ mile tows and again as four $\frac{3}{4}$ -mile tows. The length of transects were: Casco Bay 3 miles, New Meadows River 6 miles, Sheepscot River 6 miles, and Damariscove Island 9 miles. Paired tows using the Gulf III and BB #1 trawl were made in the Sheepscot and Damariscotta estuaries. Buoy nets were set overnight in the Sheepscot estuary.

PRELIMINARY FINDINGS: Large catches (110 to 422) of herring larvae were made near Cape Porpoise and offshore of the Saco Bay area and good catches (34) were made in Saco Bay and Casco Bay. Two weeks later catches in that same area were very small. Other fluctuations in larval abundance occurred in Casco Bay where two catches on one day of 36 larvae with the trawl was reduced to only a few larvae on the following day. Off Damariscove Island an abundance of larvae was found on November 8 and 36 hours later only a single larvae was taken at the same station.

A hydrographic station was occupied at 12 continuity stations and surface salinometer measurements were obtained at all other stations.

Note: See Commercial Fisheries Review, September 1965 p. 38; February 1965 p. 35.



North Pacific Fisheries Explorations and Gear Development

MODIFIED PELAGIC TRAWLS TESTED:

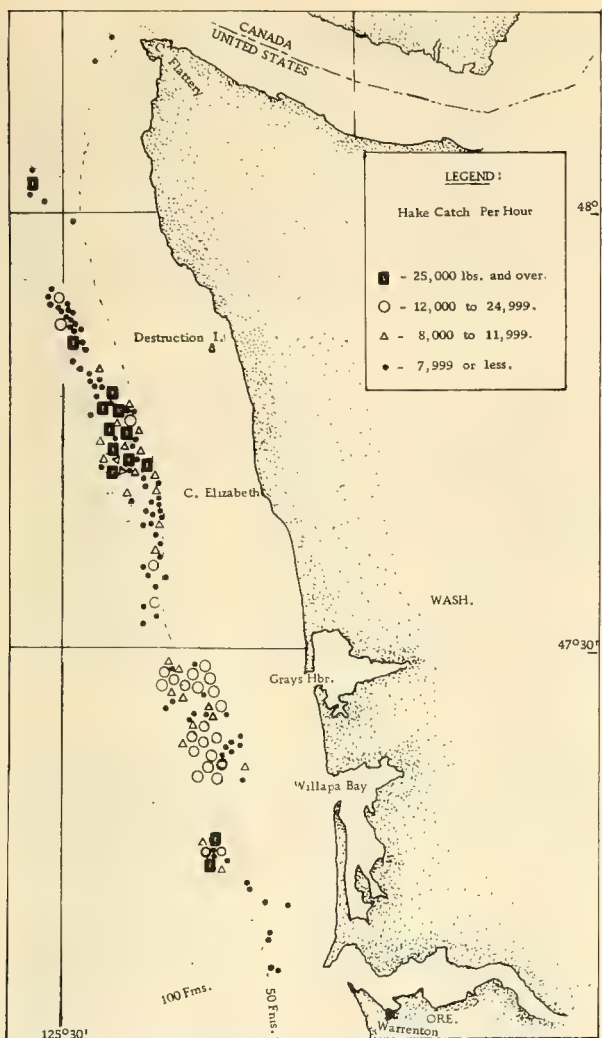
M/V "Western Flyer" Cruise 6 (July 16-October 22, 1965): To determine the commercial production potential of Pacific hake (Merluccius productus) when fished with experimental "Cobb" pelagic trawls and accessory equipment was the primary objective of this 99-day cruise off the Washington coast. The exploratory fishing vessel Western Flyer was chartered for that purpose by the U. S. Bureau of Commercial Fisheries. Other objectives included the collection of related data such as: (1) economic factors related to commercial exploitation; (2) ruggedness and reliability of experimental gear; (3) catch rates in time and space; (4) analysis of catching technique and fishing methodology; and (5) relative effectiveness of various loading and unloading methods and procedures.

AREA OF OPERATIONS: Fishing was conducted along the coast of Washington from Cape Flattery to the Columbia River. Major areas of hake concentrations were found off Willapa Bay, Grays Harbor, Cape Elizabeth, and Destruction Island. Bottom depths ranged from 30 to 100 fathoms, although most drags were made between the 50- and 65-fathom contours. Hake were usually found from 2 to 10 fathoms off the bottom.

All fish caught during the cruise were delivered to a reduction plant at Warrenton, Oreg. (near the mouth of the Columbia River).

EQUIPMENT: The Western Flyer is a 70-foot seine-type vessel powered by a 290-hp. engine and was operated with a four-man crew. Deck machinery includes separate drum trawl winches, trawl-net reel, and dual hoists--all hydraulically operated. The vessel's hold is fitted with a watertight aluminum tank for holding live king crab. Calculated capacity of the tank is about 65 tons.

Fishing on this cruise was conducted with "Cobb" pelagic trawls constructed of either conventional multifilament or ribbon-type monofilament webbing. A dual unit depth telemetry system with electrical core towing cables provided depth readings at each hydrofoil-type otter board. A patented closing device (Holland clip) was used in place of the conventional "hangmen's" knot to secure the cod end of the net.



Areas of explorations during M/V Western Flyer Cruise 6 (July 16-October 22, 1965).

AVAILABILITY OF FISH: On the basis of 1964 exploratory fishing, it was expected that large schools of hake would be available within a short running distance of the Columbia River. In contrast, no large concentrations of hake were found in that area although it had repeatedly been surveyed by the Western Flyer, another chartered vessel the St. Michael, and the Bureau's exploratory fishing vessel John N. Cobb. Low availability of fish may have been due to unusually high water temperatures along the Washington and Oregon coasts.

Occasional good catches were made on small isolated schools of fish along the central and northern coast of Washington. Schools

seemed to disperse rapidly, making it difficult to set back on the same school of fish. Eleven days of the cruise were spent seeking scattered schools of hake.

CATCHES: A total of 170 drags made during the cruise yielded 872 tons of fish, with the largest single catch 60,000 pounds. Catches exceeding 25,000 pounds an hour were made during 13 tows. Twenty-seven tows had catches ranging between 12,000 and 25,000 pounds an hour. Twenty-seven tows yielded catches ranging between 8,000 and 12,000 pounds an hour, and 90 tows were made having catches below 8,000 pounds an hour. A total of 13 tows had no significant catch. The length of time for each tow varied but was usually about 60 minutes.

GEAR PERFORMANCE: Very few difficulties were experienced while using the experimental nets, cable, and depth telemetry system. The gear was operated by commercial fishermen under production conditions and found to be suitable for sustained fishing.

No significant difficulties developed in transferring fish from the net to the hold. The "Holland clip," a patented cod-end closing device, aided greatly in rapid splitting of 1-ton lifts directly from the water into the hold. About 1,000 pounds of hake a minute were loaded.

At first it was necessary to unload catches from the Western Flyer using pitchforks and tubs. Later, a pump was installed at the reduction plant which successfully removed the fish after numerous mechanical difficulties were overcome. About 8 hours were required to remove fish by hand whereas the pumping operation was completed in about 4 hours.

Severe gilling of hake occurred at times in the 3-inch trawl body web. The average size of hake taken in 1964 was 54 centimeters (21.3 inches) whereas in 1965 it was 52 centimeters (20.5 inches). During several trips in 1965 the average length was only 48 centimeters (18.9 inches).

A comparison of catch rates per drag made by two types of "Cobb" pelagic trawls appeared significant. A total of 135 drags made with the conventional multifilament net yielded 1,062,270 pounds of fish for an average yield of 7,870 pounds per drag. Thirty-five drags with the monofilament net yielded

436,630 pounds for an average catch of 12,480 pounds per drag--about 60 percent more effective (preliminary evaluation).

WEATHER: The weather was good during the first 80 days of the cruise. But unfavorable conditions of the Columbia River bar often delayed the vessel's arrival in port by several hours. On one occasion a 10-ton deckload was swept overboard.

About 62 days of the cruise were actually spent at sea hunting and fishing hake. The remaining 37 days were lost to unloading, bad weather, mechanical failures on the vessel, and other disruptions.

CONCLUSIONS: (1) Availability of hake in 1965 was less than in 1964; (2) electric towing cable for telemetry on commercial fishing vessels is feasible; (3) on the basis of available data, the "Cobb" pelagic trawl may be more effective when constructed of monofilament webbing; (4) hake can be held for 3 days without ice or refrigeration and processed successfully; (5) the "Holland clip" aids materially when splitting fish aboard; (6) the after portion of a commercial "Cobb" pelagic trawl body should be constructed of $2\frac{1}{2}$ " 24-thread web to reduce damage from gilling and fish teeth; (7) vessel hold should have an effective sump pump to remove excess water taken aboard with fish; (8) a 290-hp. engine cannot control the "Cobb" pelagic trawl in strong cross tides; (9) the hold must be watertight to prevent odors from passing forward in the bilge.

Note: See *Commercial Fisheries Review*, October 1965 p. 44; September 1965 p. 40.



Oceanography

RESEARCH VESSEL

"JOHN ELLIOTT PILLSBURY"

COMPLETES 8-MONTH EXPEDITION:

A 23,500-mile 8-month oceanographic research expedition in the Atlantic Ocean, the Mediterranean, and the Baltic and Black Seas by the research vessel John Elliott Pillsbury ended November 15, 1965. The 176-foot vessel is operated by the Institute of Marine Science, University of Miami, Miami, Fla.

It will take many months to compile and evaluate the scientific data obtained on this important expedition, the Institute director

said. He states that certain discoveries were made that may overturn well-established theories about the deep sea and its processes and productivity. For example, the Institute's scientists found chlorophyll-containing organisms (tiny green plants) living and reproducing at a depth of almost three miles. Heretofore most scientists have believed that such organisms could exist only in the ocean's upper layers where sunlight penetrates. This remarkable discovery suggests that the total productivity of the oceans may be many times greater than previously thought.

The expedition by the vessel John Elliott Pillsbury began in March 1965 when she proceeded from Miami through the West Indies and to South America. Following studies of productivity and the chemistry of sea water in the Guiana basin and at the mouth of the Amazon River, she crossed the Atlantic at the Equator, investigating surface and subsurface currents. During that leg of the cruise the vessel oceanographers took part in EQUALANT V, an international survey of the tropical Atlantic in which scientists from 11 nations participated.

Along the west coast of Africa the research vessel conducted a biological investigation of the southern part of the Gulf of Guinea, collecting fish and invertebrates from surface waters, the mid-depths, and the deep-sea floor. A number of new species of marine life were discovered. She then proceeded north to the Straits of Gibraltar and entered the Mediterranean Sea. Extensive geological, geophysical, and geochemical studies were made in the Mediterranean, the Baltic, and the Black Seas. Submarine volcanoes were investigated and studies of deep-sea sediments, currents, and bottom topography carried out. In the Black Sea, deep-sea photographs were obtained of dead fish lying intact on the bottom where they had sunk from surface waters. Because of the lack of oxygen in the deep water of the Black Sea, the bodies of surface animals that sink do not decompose in the usual manner. The bottom sediments of the Black Sea were studied for clues to the origin of petroleum about which very little is known.

The return trip of the vessel was westward across the Atlantic, from the Straits of Gibraltar and on to her home base in Miami. On this leg she conducted coring and dredging operations.

The John Elliott Pillsbury was commissioned in July 1963, and with the completion of this latest expedition has logged more than 500 days and over 73,000 miles at sea on expeditions and cruises for the University of Miami's Institute of Marine Science. The vessel carries a staff of 13 scientists and a crew of 21. (News of Institute of Marine Science, Miami, Fla., November 11, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 41.

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NEW U. S. RESEARCH VESSEL READY FOR DELIVERY:

The new oceanographic research vessel Oceanographer, built for the Coast and Geodetic Survey, U. S. Department of Commerce, was scheduled to be delivered to that agency in January 1966. The 3,800-ton vessel, built and outfitted at a cost of \$7 million, is 303 feet long and is to be permanently based at Seattle, Wash., in late 1966 or early 1967. She will be used for a wide variety of oceanographic surveys in the Pacific Ocean.

Following delivery and subsequent installation of specialized automated oceanographic instrumentation, the Oceanographer will probably be based temporarily in the Jacksonville, Fla., area for about a year, during which time she will conduct oceanographic research in the Atlantic Ocean.

The Oceanographer's sistership, the Discoverer, which is scheduled to be delivered later this year, is expected to remain on the East Coast. She will also be berthed for perhaps a year in the Jacksonville area. Both vessels were built at a Jacksonville shipyard and it was necessary to base them near the construction site during the "shakedown" period which follows delivery.

Each vessel will have a cruising range of 16,000 miles and will carry a normal complement of 13 officers, a crew of 39, and 45 technical and scientific personnel, with additional accommodations for 8 visiting scientists. All scientific working areas will be air-conditioned with interconnecting communications. Closed circuit television will be provided throughout the engineroom, where a centralized control system will provide remote starting and stopping of machinery, programming of the fuel and ballast system, and the automatic recording of operating data at a master control station.

Another feature will be a center well running vertically through each vessel which will enable special experimental equipment to be lowered and SCUBA divers to enter and leave the vessel. Special bow-viewing ports below the water line will permit underwater observations. Laboratory space of over 4,100 square feet will be provided. (U. S. Coast and Geodetic Survey, November 12, 1965.)

Note: See Commercial Fisheries Review, June 1964 p. 23.



Oregon

WILLAMETTE RIVER SPRING CHINOOK SALMON RETURNS FOR 1965:

A record number of adult spring chinook salmon arrived at the Oregon Fish Commission's Dexter Dam trapping facility on the Middle Willamette River east of Eugene during the 1965 season, according to the Commission's fish culture director. Some 6,600 chinook were counted into the holding ponds at Dexter compared with 5,100 during the 1964 season and 6,000 in 1963. Observations by hatchery personnel were that there was a substantial spawning population in the river below Dexter, probably at least as many as the previous year when about 1,000 spawners were counted during a check by helicopter.

At Minto Pond below the Detroit Dam on the North Santiam River, where spring chinook are taken primarily to supply eggs for the Marion Forks Hatchery, the take of 1,900 adults was lower in 1965 than in both 1963 and 1964 when 2,900 and 2,600, respectively, were counted, but still ranked fifth in the number of fish during the 15 seasons since the dam was constructed. The Minto trap was out of operation until September 1, 1965, because of repairs to the water supply diversion dam at the site. Ordinarily the trap would have been operating from May into the fall months to take spring chinook moving upriver. The fish stayed in the river during the summer since they were unable to enter the trap. It was considered doubtful that this had any effect on the number of fish handled at Minto.

The Marion Forks egg harvest in 1965 was considered excellent, with 5.6 million eggs taken compared with 4.9 million in 1964. The average egg take at that station during the past 10 years has been 2.6 million. The 1965 egg harvest at Dexter was also excel-

lent, with the season's total at 9.6 million eggs. This exceeded the previous year's 9.4 million but was below the 12 million egg take in 1963. The average egg harvest at Dexter over the past 10 years has been 3.9 million. There was a substantial loss of fish from "Columnaris" at Dexter, with about 1,200 adults succumbing to the effects of that disease. It was estimated that the reduction in the egg take caused by these mortalities was 3.5 million.

Despite the good hatchery showing, the 1965 run of spring chinook in the Willamette was calculated at 41,000 fish, about 9,000 below the average of the past 20 years; but in 7 of those 20 seasons there have been smaller runs with a low of 24,800 fish in 1950. Sport fishermen landed about 9,000 chinook during the 1965 season, down about one-quarter from the 20-year average catch of 12,000 fish. This catch by sport fishermen was 22 percent of the run compared to the 20-year average of 27 percent. The Willamette Falls count was 29,000 compared with the 20-year average of 36,000.

The Willamette spring chinook run is not harvested to any extent by the commercial fishery in the Columbia River since the peak of that run passes up the Columbia and into the Willamette between the winter and spring gill-net seasons.

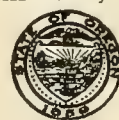
Hatcheries operated by the Oregon Fish Commission on the Willamette River system, including the Willamette, McKenzie, South Santiam, and Marion Forks stations have a combined rearing capacity of 7 million spring chinook yearlings. So far, some 4.5 million spring chinook eggs have been transferred to the U. S. Fish and Wildlife Service for rearing at the Eagle Creek National Fish Hatchery in the Clackamas River drainage, and transfer to other Federal hatcheries in the Columbia River Basin. Over 10 million additional eggs remain in Commission hatcheries to be used in the rearing program or for research studies associated with new dams on Willamette tributaries.

About 30 percent of the chinook salmon passing over Willamette Falls in spring 1965 eventually were handled at Commission holding ponds indicating the substantial contribution the hatcheries are making in maintaining the Willamette River run. (Oregon Fish Commission, November 1, 1965.)

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SURPLUS SILVER SALMON FROM COASTAL HATCHERIES USED TO SEED OTHER WATERS:

In the fall of 1965, most Oregon State fish hatcheries in the coastal area were receiving a surplus of silver salmon spawners. The excess salmon were replanted in streams which can support larger salmon runs. The Oregon State Fish Commission hatchery director emphasized that sufficient fish are allowed to escape upstream beyond hatchery racks to take full advantage of whatever natural spawning area is available. Only after both hatchery and natural spawning area needs are taken care of are fish hauled to other waters, the hatchery director stated. (Oregon State Fish Commission, November 17, 1965.)



Salmon

U. S. PACIFIC COAST CANNED STOCKS, NOVEMBER 1, 1965, AND NEW SEASON PACK:

On November 1, 1965, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 2,614,869 standard cases (48 1-lb. cans)--757,344 cases less than on November 1, 1964, when stocks totaled 3,372,213 standard cases.

On the basis of total stocks of 3,478,830 actual cases (consisting of cans of $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., 1-lb., etc.), red salmon accounted for 1,938,736 cases (mostly 1-lb. and $\frac{1}{2}$ -lb. cans) or 57.0 percent of the total canners' stocks on November 1, 1965; pink salmon accounted for 793,674 cases or only 22.8 percent (546,934 cases were 1-lb. talls). Next came chum (328,219 cases, mostly 1-lb. talls), followed by coho or silver (232,458 cases), and king salmon (140,743 cases).

Table 1 - Total Canners' Stocks of Pacific Canned Salmon,
November 1, 1965

Species	Nov. 1, 1965	July 1, 1965	Nov. 1, 1964
	(No. of Actual Cases)		
King	140,743	24,850	104,399
Red	1,938,736	109,129	750,483
Coho	232,458	62,709	250,162
Pink	793,674	399,169	2,109,841
Chum	328,219	262,259	817,515
Total	3,478,830	858,116	4,032,400

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965, the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

Table 2 - Total Cannery Stocks on Hand November 1, 1965 (Sold and Unsold), By Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 1/4-lb.	7,795	274,249	77,739	4,515	67	364,365
48 1/2-lb.	116,088	696,677	90,534	214,269	63,806	1,181,374
48 1-lb.	16,187	1,008,590	52,907	546,934	252,561	1,877,179
12 4-lb.	573	4,220	11,278	27,956	11,785	55,912
Total	140,742	1,983,736	232,458	793,674	328,219	3,478,830

Table 3 - Cannery Shipments from July 1, 1965, to November 1, 1965, By Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 1/4-lb.	6,405	150,799	47,099	3,978	-	208,281
48 1/2-lb.	52,764	286,338	42,014	198,071	30,286	609,473
48 1-lb.	4,544	452,033	55,193	502,703	245,982	1,260,455
12 4-lb.	418	5,239	2,991	29,983	4,836	42,631
Total	63,295	894,409	147,297	734,735	281,104	2,120,840

Table 4 - Pacific Canned Salmon Pack by Species and Can Size, 1965

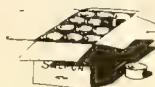
Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(No. of Actual Cases)					
48 1/4-lb.	12,451	391,848	116,056	7,378	45	527,778
48 1/2-lb.	148,693	924,106	119,880	334,036	72,351	1,609,066
48 1-lb.	17,875	1,443,614	68,314	723,541	267,060	2,520,404
12 4-lb.	169	9,448	12,796	54,285	7,608	84,306
Total	179,188	2,769,016	317,046	1,129,240	347,064	4,741,554

Shipments at the cannery level of all salmon species from July 1 to November 1, 1965, totaled 1,659,839 standard cases. The carry-over of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses): king, 95,503 standard cases (78,155); red, 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 94 percent of the 1965 salmon pack. (Division of Statistics and Economics. National Cannery Association, December 1, 1965.)

Note: See Commercial Fisheries Review, Sept. 1965 p. 41.



Shrimp

BREADED PRODUCTION, JULY-SEPTEMBER 1965:

United States production of breaded shrimp during the third quarter of 1965 amounted to about 21.0 million pounds -- a decrease of about

Table 1 - U. S. Production of Breaded Shrimp by Areas, July-September 1965

Area	1/July-Sept. 1965		July-Sept. 1964	
	No. Plants	Quantity 1,000 Lbs.	No. Plants	Quantity 1,000 Lbs.
Atlantic	15	6,542	14	7,936
Gulf	16	12,809	21	13,790
Pacific	8	1,615	8	2,044
Total	39	20,966	43	23,770
1/Preliminary.				

Table 2 - U. S. Production of Breaded Shrimp by Months, 1964-65

Month	1/1965	1964
	.. (1,000 Lbs.). .	
January	6,926	7,347
February	6,632	8,045
March	7,771	7,249
April	6,120	7,027
May	6,023	6,171
June	5,855	6,588
July	6,410	8,641
August	7,255	7,299
September	7,301	7,830
October	-	9,169
November	-	7,852
December	-	7,460
Total	-	90,478
1/Preliminary.		

2.8 million pounds or 11.8 percent as compared with the same period in 1964.

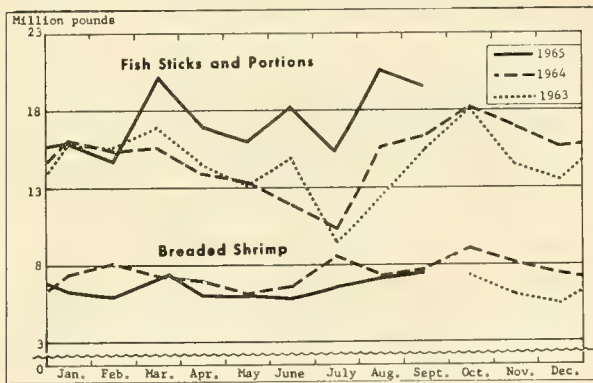
The Gulf States ranked first in the production of breaded shrimp with 12.8 million pounds, followed by the Atlantic States with 6.5 million pounds, and the Pacific States with 1.6 million pounds.



United States Fisheries

FISH STICKS AND PORTIONS, JULY-SEPTEMBER 1965:

United States production of fish sticks and fish portions amounted to 55.6 million pounds during the third quarter of 1965, according to preliminary data. Compared with the same quarter of 1964, this was an increase of 13.4 million pounds or 31.6 percent. Fish portions (36.5 million pounds) were up 10.8 million pounds or 42.2 percent, and fish sticks (19.1 million pounds) were up 15.3 percent.



U.S. production, 1963-65.

Cooked fish sticks (17.8 million pounds) made up 93.2 percent of the July-September 1965 fish stick total. There were 36.0 million pounds of breaded fish portions produced, of which 27.6 million pounds were raw. Unbreaded fish portions amounted to 453,000 pounds.

Table 1 - U. S. Production of Fish Sticks by Months and Type, July-September 1965 1/

Month	Cooked	Raw	Total
	. . . (1,000 Lbs.) . . .		
July	4,883	414	5,297
August	6,147	380	6,527
September	6,784	509	7,293
Total 3rd Qtr. 1965 1/	17,814	1,303	19,117
Total 3rd Qtr. 1964 2/	15,017	1,570	16,587
Total 1964 2/	67,810	5,722	73,532

1/ Preliminary.
2/ Revised.

Table 2 - U. S. Production of Fish Portions by Months and Types, July-September 1965 1/

Month	Breaded			Un-	Total
	Cooked	Raw	Total	breaded	
	. . . . . (1,000 Lbs.)				
July	2,010	7,861	9,871	101	9,972
August	3,310	10,561	13,871	121	13,992
September	3,116	9,173	12,289	231	12,520
Tot.3rd. Qtr.1965 1/	8,436	27,595	36,031	453	36,484
Tot.3rd. Qtr.1964 2/	5,029	20,140	25,169	489	25,658
Total 1964 2/	20,956	82,135	103,091	2,541	105,632
1/Preliminary. 2/Revised.					

The Atlantic States continued to lead in the production of both fish sticks and fish portions, with 14.9 and 22.6 million pounds, respectively. The Inland and Gulf States ranked second with 2.3 million pounds of fish sticks and 13.2 million pounds of fish portions.

* * * * *

NATIONAL ANADROMOUS FISHERY PROGRAM ACT:

Far-reaching benefits to the Nation's sport and commercial fisheries will result from legislation recently signed into law by President Johnson, announced Secretary of the Interior Stewart L. Udall on November 18, 1965. Public Law 89-304, the National Anadromous Fishery Program Act, authorizes cooperative projects between the Federal Government and the various States to conserve and enhance the United States fisheries for salmon, shad, striped bass, and other anadromous fish that live in the sea or Great Lakes, and migrate up streams to spawn.

The Act authorizes future appropriations not to exceed \$25 million for the period ending June 30, 1970. Not more than \$1 million can be obligated in any one fiscal year in any one State. Funds for financing the cooperative program have yet to be appropriated by Congress.

Projects authorized under the law include investigations and research into anadromous fish problems "as may be desirable to carry out the program." These include (1) improving access to spawning areas; (2) construction and operation of facilities to improve feeding and spawning conditions; (3) improving facilities for free migration of fish; and (4) construction and operation of fish hatcheries.

Work under the anadromous fish program will be covered by agreements between the

Secretary of the Interior and a State or several States acting jointly. The agreements will describe the actions to be taken by the cooperating agencies, benefits expected, estimated costs, the Federal share of the costs which cannot exceed 50 percent of the total, duration of the agreement, and conditions for disposing of any property acquired by the Secretary following termination of the project.

Representatives of the Department of the Interior in the near future will confer with directors of State fish and game departments concerning proposed cooperative agreements, the Interior Secretary said.



U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, JULY 1965:

During July 1965 a total of 53 vessels of 5 net tons and over was issued first documents as fishing craft as compared with 56 in July 1964. There were 35 documents cancelled for fishing vessels in July 1965 as compared with 41 in July 1964.

U. S. Fishing Vessels 1/-Documents Issued and Cancelled, by Areas, July 1965 with Comparisons				
Area (Home Port)	July		Jan.-July	
	1965	1964	1965	1964
. . . . (Number).				
<u>Issued first documents 2/:</u>				
New England	6	5	23	24
Middle Atlantic	-	-	7	5
Chesapeake	3	1	21	24
South Atlantic	6	5	43	30
Gulf	23	22	167	142
Pacific	15	23	128	103
Great Lakes	-	-	1	1
Hawaii	-	-	-	1
Puerto Rico	-	-	1	1
Total	53	56	391	331
<u>Removed from documentation 3/:</u>				
New England	1	9	24	26
Middle Atlantic	-	3	11	15
Chesapeake	4	3	22	20
South Atlantic	3	1	46	25
Gulf	16	5	70	59
Pacific	10	20	57	102
Great Lakes	1	-	10	9
Hawaii	-	-	2	-
Puerto Rico	-	-	1	-
Total	35	41	243	256

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.

2/There were 6 redocumented vessels in July 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 36 in 1965; 1 in 1961; 1 in 1960; 1 in 1956; and 14 prior to 1948.

3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.

Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U.S. Treasury Department.

U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-October 30, 1965, amounted to 37,954,445 pounds (about 1,808,200 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 2.1 percent from the 37,162,653 pounds (about 1,769,650 standard cases) imported during January 1-October 31, 1964.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty is limited to 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

* * * * *

TRENDS IN UNITED STATES EXPORTS OF FISHERY PRODUCTS, 1964:

In 1964, the value of United States exports of fishery products totaled \$64,204,000--a 13-percent increase over the previous year and a record high for the export of fishery products. The value of fishery exports in 1964 was 63 percent higher than the average of the previous ten years. In 1964, canned salmon replaced fish oil as the principal fishery product exported by the United States.

Table 1 - Value of United States Exports of Fishery Products, 1954-1964			
Year	Edible	Inedible	Total
	. . . . . (US\$1,000)		
1964	42,878	21,320	64,204
1963	30,376	26,229	56,605
1962	22,470	13,258	35,728
1961	19,594	15,116	34,710
1960	25,622	18,543	44,165
1959	26,747	17,495	44,242
1958	19,440	11,564	31,004
1957	20,549	15,403	35,952
1956	22,939	16,564	39,503
1955	24,923	15,054	39,977
1954	16,238	15,289	31,527

Trends by Countries: U. S. fishery products are marketed in well over 100 countries throughout the world. The United Kingdom, Canada, and Japan buy over half of U. S. exports of fishery products. In 1964, eleven countries each received U. S. fishery exports valued over US\$1.0 million. Together the eleven countries accounted for 87 percent of total U. S. exports of fishery products.

Table 2 - United States Exports of Fishery Products by Selected Countries of Destination, 1960-1964

Country	1964	1963	1962	1961	1960
(US\$1,000)					
United Kingdom	15,102	13,081	8,249	4,554	8,460
Canada	10,434	11,156	8,846	10,265	10,309
Japan	9,200	7,819	939	2,984	3,295
Sweden	6,425	4,473	1,076	1,665	2,613
Netherlands	4,879	2,593	2,273	2,385	4,350
West Germany	3,146	3,638	1,467	1,555	2,201
France	2,325	1,889	1,073	1,007	1,048
Switzerland	1,284	2,229	1,712	738	1,082
Belgium	1,115	445	547	351	537
Norway	1,064	1,539	403	2,390	1,390
Philippines	1,043	403	320	582	2,494
Italy	656	1,643	869	423	643
Hong Kong	603	388	383	368	269
Greece	471	566	487	364	313
Australia	426	203	198	458	444
Mexico	417	263	375	459	616
Venezuela	238	183	274	360	461
Ecuador	39	1	171	82	293
Other	5,337	4,094	6,066	3,720	3,347
Total	64,204	56,606	35,728	34,710	44,165

UNITED KINGDOM: Exports of fishery products to the United Kingdom have increased steadily since 1961. For the second year in a row the United Kingdom was the leading export market for U.S. fishery products. Exports of fish oil practically ceased in 1964. However, this decrease was offset by the 92-percent increase in exports of canned salmon and the 52-percent increase in exports of fresh and frozen salmon. The major fishery commodities exported to the United Kingdom were:

Commodity	1964	1963
(US\$1,000)		
Fish and marine-animal oil	214	5,142
Salmon, canned	11,559	6,006
Salmon, fresh or frozen	1,178	777
Shrimp, canned	1,116	798
Other	1,035	358
Total	15,102	13,081

CANADA: In 1964, Canada (traditionally the major market for exports of U.S. fishery products) remained in second place as an export market. The value of fishery products exported to Canada declined 6 percent from the previous year. The principal items exported to Canada were:

Commodity	1964	1963
(US\$1,000)		
Shrimp, fresh or frozen	2,214	2,165
Shrimp, canned	1,847	1,592
Seal furs	2,004	1,935
Fish, fresh or frozen	1,001	1,043
Canned fish	124	1,002
Fish, shellfish and other marine-animal products, inedible	589	879
Fish, marine-animal, and liver oil	73	543
Salmon, fresh or frozen	547	581
Other	2,035	1,416
Total	10,434	11,156

OTHER COUNTRIES: The values of the principal fishery products exported in 1964 to other major markets were:

Country & Product	US\$1,000
Japan:	
shells, unmanufactured	1,487
shrimp, frozen	4,304
salmon, fresh or frozen	1,947
Sweden, fish oil	5,901
Netherlands, fish oil	2,853
West Germany, fish oil	2,179
France:	
salmon, fresh or frozen	1,290
seal furs	144
Switzerland, seal furs	988
Belgium, canned salmon	638
Norway, fish oil	1,026
Philippines, canned mackerel	553
Italy, seal furs	536

Trends by Areas: During 1964, Europe imported 59 percent of the total U.S. fishery products exports. The countries of the European Free Trade Association (EFTA) imported fishery products valued at \$24,956,000 or 39 percent of U.S. fishery products exports. Members of the European Economic Community (EEC or Common Market) imported fishery products valued at \$12,121,000 or 18 percent of the total fishery products exported. Products valued at \$13,008,000 or 20 percent of the total exports went to North America. Exports to Asian countries ranked third followed by South America and Africa.

Table 3 - United States Exports of Fishery Products by Area of Destination, 1964

Area	Edible	Inedible	Total
(US\$1,000)			
Europe	21,639	16,414	38,053
North America	9,865	3,143	13,008
Asia	10,019	1,575	11,594
South America	343	112	455
Africa	314	36	350
Oceania	698	46	744
Total	42,878	21,326	64,204

Trends by Commodities: Significant increases in the exports of several major prod-

Table 4 - Value of United States Exports of Fishery Products by Selected Commodities, 1960-1964

Commodity	1964	1963	1962	1961	1960
(US\$1,000)					
Fish oils	13,096	15,636	6,047	8,908	10,688
Seal furs	4,706	5,877	3,851	3,097	3,309
Shells, unmanufactured	1,606	2,136	1,285	1,380	2,636
Misc. fish (mostly fresh-water, fresh or frozen)	1,664	1,858	1,135	809	947
Oysters, shucked	301	191	311	448	497
Salmon:					
fresh or frozen	5,371	2,530	872	647	1,677
cured	743	509	528	593	435
canned	14,852	8,239	7,292	5,580	9,830
Mackerel, canned	1,140	681	671	581	211
Miscellaneous fish, canned	596	628	460	391	355
Sardines, canned not in oil	485	666	1,285	1,336	3,443
Shrimp:					
fresh or frozen	7,103	7,748	3,299	3,694	2,303
canned	3,664	3,054	2,572	2,487	3,383
Squid, canned	662	742	729	353	691

ucts were important factors in record-high exports of U. S. fishery products in 1964. Canned salmon exports increased 80 percent over the previous year and replaced fish oil as the most important among fishery products exported. Exports of fresh and frozen salmon more than doubled; canned mackerel exports increased 67 percent and shucked oysters 58 percent. The value of fish oil exports decreased 16 percent. Notable decreases also occurred in the exports of seal furs and unmanufactured shells.



Virginia

CATCH FORECASTS FOR MAJOR FISHERIES IN 1966:

Catch forecasts for major Virginia fisheries in 1966 were issued in October 1965 by the Virginia Institute of Marine Science. The predictions were based on sampling work done in the summer of 1965. Following are the Institute's forecasts:

Shellfish: SEED AND MARKET OYSTERS: Setting in the James River remains far below necessary levels for a suitable seed area. Seed supply will probably meet light demand. Supply of market oysters remains low due to continuing presence of MSX; no significant change is foreseen.

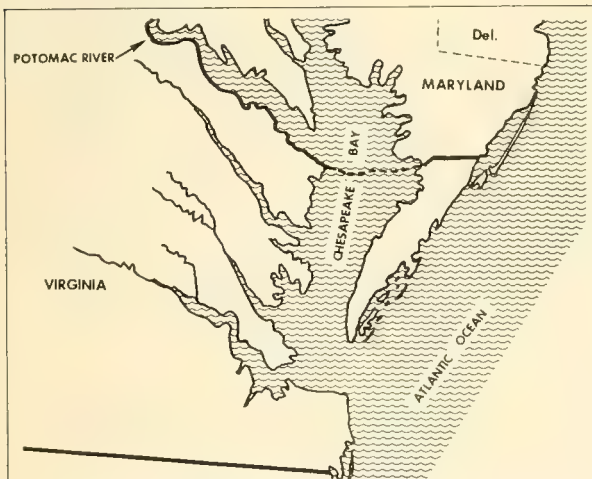


Fig. 1 - Virginia fishing areas.

BLUE CRAB: Marked increase in abundance; above average catches expected in 1966.

CLAMS: Insufficient data are available to predict how abundant hard or soft clams will be in the future. The supply of each is adequate to support the fishery, and both are probably under-exploited in Virginia waters.

SCALLOPS: Between April and September 1965, well over 1.5 million pounds (shucked weight) of sea scallops worth more than \$900,000 were dredged off the Virginia coast. This new fishery may become important to Virginia fishermen, but the extent of the scallop beds as well as the potential yield has not yet been determined.

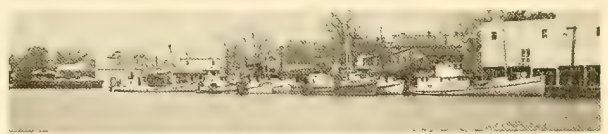


Fig. 2 - Driggers unloading at Hampton, Va.

Fish: SPOT: Some decline in abundance expected because of weak year-classes of 1964 and spring 1965.

CROAKER: Reasonably good year-classes in 1964 and again in 1965 should insure improvement in this fishery in 1966. The 1965 catch exceeded the 1964 catch substantially, although the landings were still far below the 20-year average.

SEA TROUT: Continued light supply expected in 1966 because of a series of poor year-classes. Some improvement is expected in numbers of small market-size trout in 1966 summer season. Population has been fairly stable at very low level for the past 4 years.

MENHADEN: The year-class produced during the winter of 1964/65 was relatively weak. That was the third weak year-class in succession. The 1966 summer season should be no more satisfactory than the 1965 season. No real improvement can be expected through 1967.

SUMMER FLOUNDER: Unusually large numbers of juvenile flounder appeared in Chesapeake Bay during 1964-65 and should enter the commercial and recreational fishery in 1966. Summer flounder catches should increase in 1966, unless those observations reflected only a localized situation.

OTHER FISH (alewife, herring, striped bass, shad, and sea bass): No significant change in stocks is expected, although only a limited amount of information is available for those species.



Washington

RECORD SALMON RELEASES FROM HATCHERIES IN JANUARY-JUNE 1965:

In the first 6 months of 1965, the 24 salmon hatcheries of the Washington Department of Fisheries planted 93.4 million young salmon of all species in Washington State waters. Most of those--75.2 million--were reared to migratory size before release. The remaining 18.2 million were fry that were planted in experiments and, in some instances, because of lack of rearing space or of food.

Fall chinook topped the list of releases with 54.0 million fingerlings (reared to migratory size in 3 months) and 14.8 million fry. Releases of silver yearlings (reared for a year) totaled 17.2 million, plus 1.8 million fry and 1.4 million fingerlings; spring chinook yearlings totaled 1.3 million; chum, 250,000 fry and 2.6 million fingerlings; and sockeye, 38,250 fry.

Total poundage of salmon planted by the Washington State hatcheries in January-June 1965 was a new record of slightly over a million pounds.

The supervisor of the Washington State Fisheries Hatchery Division said hatchery production had tripled in the past 10 years and that production could be tripled again in the next 10 years. Major items necessary to achieve this goal are some increases in water supplies, and an increase in rearing ponds and fish food, he said. The increased production can be accomplished with little, if any, increase in manpower.

The hatchery official said that since the State's hatcheries began rearing most salmon to a larger migratory size (the same age, but larger size than the natural stocks migrating to salt water) production had increased substantially. In an experiment, fish liberated at 35 to the pound had a return to the hatchery of 0.47 percent; an increase to 25 per pound resulted in a return of 1.31 percent; and releases of salmon 17 to the pound

resulted in a return of 2.81 percent. Ordinarily, a return to the hatchery of 1 percent is considered good. For each salmon returning to the hatchery, 3 or 4 are caught in the commercial and sport fisheries.

It was emphasized that the entire Washington State hatchery operation was assessed on a strict cost-production basis. Washington State estimates that each dollar spent returns at least three dollars worth of salmon to the State's commercial and sport fisheries. (Washington State Department of Fisheries, November 19, 1965.)

* * * * *

TEST FISHING FOR HAKE IN PUGET SOUND:

Test fishing for hake was carried out in Puget Sound waters in November 1965 by the trawler *St. Michael* under a program of the Washington State Department of Fisheries. (Hake are generally fished in offshore waters.) Under a permit issued by the Department of Fisheries, the test fishing was planned to find out if stocks of hake inside Puget Sound were abundant enough to support a fishery. Large quantities of hake have been caught in offshore experimental fishing, revealing the presence of considerable concentrations.

Under the permit issued, the vessel was to comply with all food fish licensing requirements of the State of Washington, and while it was to fish primarily for hake, any other food fish caught would be retained, sorted, and sold as such. Any salmon caught by the vessel was to be returned to the water immediately. Department personnel were permitted aboard the vessel to observe the method of fishing.

The vessel's skipper said that by using the latest electronic gear and a midwater trawl net, he could fish precisely for hake. The net used was a two-thirds scale on modified "Cobb" pelagic trawl net. (Washington State Department of Fisheries, Olympia, November 19, 1965.)

Editor's Note: The *St. Michael* had previously been chartered by the U. S. Bureau of Commercial Fisheries for 100 days (August-November 1965) of pelagic fishing gear research in Puget Sound and off the coasts of Washington, Oregon, and California. Two modified "Cobb" pelagic trawls were then tested.

Note: See *Commercial Fisheries Review*, October 1965 p. 44, and pp. 42-44 of this issue.



Wholesale Prices

EDIBLE FISH AND SHELLFISH,
NOVEMBER 1965:

From October to November 1965 prices were higher for a number of selected items (frozen dressed salmon, shrimp, oysters, canned sardines); lower for several other items; and some were unchanged. At 119.4 percent of the 1957-59 average, the overall wholesale price index for edible fishery products in November rose 1.2 percent from the previous month. As compared with the same month a year earlier, the index this November was up 9.6 percent; prices ranged from higher to substantially higher for nearly all items in the index.

Lower prices at Boston for ex-vessel large haddock (down 20.8 percent) from October to November were responsible for a 2.6-percent drop in the November 1965 subgroup index for drawn, dressed, or wholefinfish. But November prices at New York City were higher than in the previous month for frozen king salmon (up 4.5 percent) and round

fresh yellow pike (up 27.0 percent), and at Chicago for Lake Superior fresh whitefish (up 9.6 percent). As compared with the same month a year earlier, the subgroup index this November was up 15.0 percent because of much higher prices for all items--some up to one-third higher than in November 1964.

Higher wholesale prices at New York City from October to November for South Atlantic fresh shrimp (up 4 cents a pound) and at Norfolk for standard shucked oysters (up 4.5 percent) were responsible for a 4.3-percent advance in the November 1965 subgroup index for fresh processed fish and shellfish. Prices for fresh haddock fillets were down 3.0 percent from the previous month. The subgroup index this November was up 11.8 percent as against the same month in 1964--prices were higher for all items with shucked oysters up 20.8 percent.

In the subgroup for frozen processed fish and shellfish, prices this November were up for all items except haddock fillets and the index rose 3.1 percent. From October to No-

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, November 1965 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			Nov. 1965	Oct. 1965	Nov. 1965	Oct. 1965	Sept. 1965	Nov. 1964
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					119.4	118.0	116.2	108.9
<u>Fresh & Frozen Fishery Products:</u>					122.7	121.1	117.9	113.0
Drawn, Dressed, or Whole Finfish:					128.5	131.9	135.8	111.7
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.18	.23	143.4	181.0	142.1	107.8
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.48	140.5	142.0	150.8	112.4
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.84	122.3	117.0	131.0	115.6
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.58	.53	85.8	78.3	85.8	74.6
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.78	.61	126.9	99.9	155.5	106.4
<u>Processed, Fresh (Fish & Shellfish):</u>					124.2	119.1	107.3	111.1
Fillets, haddock, sm., skins on, 20-lb. tins	Boston	lb.	.48	.49	115.4	119.0	116.6	108.9
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.91	.87	106.6	101.4	93.7	102.5
Oysters, smoked, standards.	Norfolk	gal.	8.75	8.38	147.6	141.2	122.3	122.2
<u>Processed, Frozen (Fish & Shellfish):</u>					110.9	107.6	105.3	110.8
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.41	.40	103.9	100.1	100.1	88.7
Haddock, sm., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	117.3	117.3	111.4	112.9
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.31	112.2	107.0	108.7	103.4
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.91	.87	107.3	102.6	101.4	112.7
<u>Canned Fishery Products:</u>					114.0	113.0	113.7	102.2
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	27.00	27.00	117.7	117.7	117.7	92.6
Tuna, lt. meat, chunk, No. 1 1/2 tuna (6-1 1/2 oz.), 48 cans/cs.	Los Angeles	cs.	11.56	11.56	102.6	102.6	102.6	102.6
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	9.50	131.5	121.9	128.3	128.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.



Fresh East Coast shrimp on display at one of the stands at Fulton Fish Market, New York City.

vember, prices at Chicago for frozen shrimp were up 4.6 percent and at Boston for flounder and ocean perch fillets up 3.8 and 4.9 percent, respectively. Prices for haddock fillets were the same as in the previous month. As

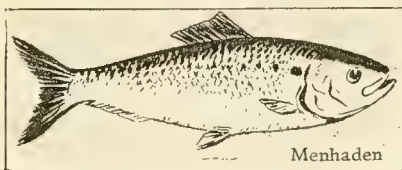
compared with November 1964, the subgroup index this November was up only slightly (0.1 percent). While prices this November were generally higher than a year earlier, frozen shrimp prices were down 4.8 percent.

The November 1965 subgroup index for canned fishery products rose 0.9 percent from the previous month because of higher prices for canned Maine sardines (up 7.9 percent). Despite a substantial increase over the previous season in the 1965 pack of canned sardines, the market strengthened. The total available supply of canned sardines on November 1, 1965, was 5 percent more than a year earlier and prices this November were 2.5 percent higher. November 1965 prices for other canned fish in the index were unchanged from the previous month. As compared with November 1964, the subgroup index this November was up 11.5 percent--prices for canned pink salmon were 2.7 percent higher because of the very low 1965 pack, and for California jack mackerel up 14.2 percent. Prices for canned tuna were unchanged.



MENHADEN

The menhaden is not only the most important of the Middle Atlantic fisheries, but also the most important United States fishery in respect to the quantity landed by the commercial fishermen. For many years it has ranked second in dollar value in the region. Most of the catch is made with purse seines in coastal waters and landed at New Jersey, Delaware, and Virginia ports.



The menhaden is valuable for the industrial products (oil and meal) made from it. Practically none of the catch is used directly for human food. About one-third of all the fish meal prepared in the United States and one-fourth of the oils processed from sea animals come from menhaden taken in the Middle Atlantic region. Most of the meal is used as a supplement in feed of hogs and chickens; the oil is used in a variety of commercial products--margarine, paints, insect sprays, printer's ink, soaps, and lubricating oils--and in leather tanning and aluminum casting.

The region's 220-million-pound menhaden catch of the 1930's has increased to nearly a billion pounds in recent years with an annual ex-vessel value of about \$10 million--the result of an abundant supply of fish, larger and speedier boats, radio-equipped aircraft to spot and report the location of menhaden schools, larger purse seines and power blocks to haul them, and introduction of suction pumps to bring the fish quickly into the vessel hold and later unload them at the dock.

--Conservation Note 17, *The Big Bite*
(Commercial Fisheries of the Middle Atlantic Coast),
U. S. Fish and Wildlife Service, Washington, D. C.



International

FOOD AND AGRICULTURE ORGANIZATION

WORLD FISH CATCH TOPS 50 MILLION TONS IN 1964:

The world fish catch soared to a record 51.6 million metric tons in 1964, according to the Food and Agriculture Organization (FAO). The 1964 catch was more than 4 million metric tons above the record 47.4 million tons caught in 1963.

Peru again led with the biggest single national catch of 9,130,700 tons in 1964 as against 6.9 million tons in 1963. Peru has led the world in national fish catch since 1962, when it overtook Japan. The bulk of the Peruvian annual catch is anchoveta, which is manufactured into fish meal for use as animal feed.



Fig. 1 - In Peru, older type anchoveta fishing vessel waiting to unload at the port of Chimbote.

Japan was in second place in 1964 with a catch of 6,334,700 tons, a drop of 360,000 tons from its 1963 catch of 6,694,700 tons. The Japanese catch is more varied than that of Peru since Japanese high-seas vessels fish all over the world.

The estimated catch of about 5.8 million tons for Communist China in 1964 placed her in third place.

The U.S.S.R. was in fourth place in 1964 with a catch of 4.48 million tons, an increase

of about 0.5 million tons over her 1963 catch of 3.98 million tons.



Fig. 2 - Japanese factoryship Tenyo Maru in North Pacific.

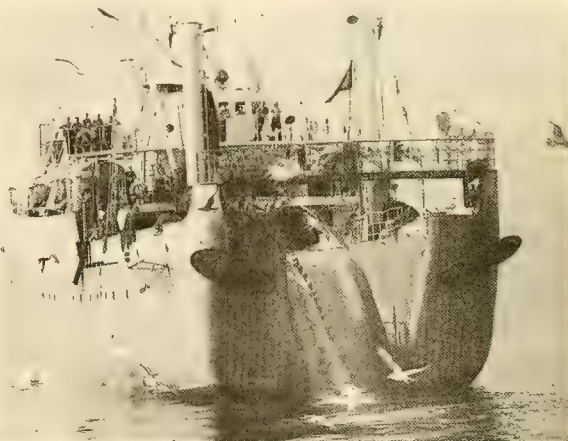


Fig. 3 - Soviet "Majakovski" stern trawler in North Atlantic.

The United States was in fifth place with 2,638,000 tons in 1964, a slight drop from the 2,776,700 tons landed in 1963.

The other countries which caught over a million tons of fish in 1964 were Norway with

International (Contd.):



Fig. 4 - United States tuna purse seiner operating from a California fishing port.

1,608,100 tons, India 1,320,300 tons, South Africa and South-West Africa (combined) 1,254,500 tons, Canada 1,210,700 tons, Spain 1,196,600 tons, Chile 1,160,900 tons, and Denmark (including Faroe Islands) 1,010,200 tons.



Fig. 5 - Unloading ocean perch from a U. S. trawler at the port of Gloucester, Mass., during a stormy winter day.

Countries with 1964 catches in excess of 0.5 million tons were the United Kingdom with 974,600 tons, Iceland 972,700 tons, Indonesia (estimated) 936,200 tons, France 780,400 tons, Federal Republic of Germany 624,300 tons, Philippines 623,500 tons, Portugal 603,700 tons, Thailand 577,000 tons, and Republic of Korea 524,000 tons.

Asian Fishermen Land 19 Million Tons in 1964: The nations of Asia and the Far East caught 19 million tons of fish in 1964 to lead all other continental areas. That catch was slightly above the 1963 total Asian catch of 18.98 million tons. But Asia's percentage of the world catch in 1964 fell to 37 percent as against 40 percent in 1963.

Japan again led Asia in national catch. Following Japan, the next Asian fishing nation was Communist China. India came next, and on a world basis ranked number seven. Next in order was the Philippines (up 57,900 tons from 1963), followed by Thailand and the Republic of South Korea. The last two for the first time joined the small circle of nations which catch above 0.5 million tons a year. Thailand's 1964 catch was up 158,300 tons over 1963 landings. South Korea's catch was 58,300 tons above 1963 and ranked 7th in Asia and 21st in the world.

Other Asian nations catching 50,000 tons or more were: South Viet Nam 397,000 tons, Taiwan 376,700 tons, Burma 360,000 tons, Malaysia 241,000 tons, Cambodia 164,600 tons, Ceylon 96,100 tons, and Hong Kong 76,300 tons.



Fig. 6 - Fresh-water fish farm near Mexico City, Mexico.

South America Lands One-Fifth of 1964 World Fish Catch: The South American fish catch reached an all-time high of 11,130,000 metric tons in 1964. That was more than one-fifth of the world total, and well above South America's previous high of 8.42 million tons caught in 1963.

Peru accounted for 82 percent of the South American catch. Her catch has now gone up about 110 times since the end of the Second World War.

Chile was the second most important South American fishing nation, with 399,000 tons more than in 1963. Argentina followed with 160,000 tons (an increase of 36,100 tons). Venezuela caught 110,600 tons as compared with 97,300 tons in 1963. Colombia increased her 1964 catch to 53,300 tons, a gain of 12 percent over the previous year. Ecuador caught

International (Contd.):

46,300 tons in 1964, a slight drop from its record 49,700 tons in 1963. Catches of other South American countries were small.

Europe's 1964 Fish Catch a Record: The nations of Europe, excluding the Soviet Union, caught 9.66 million metric tons of fish in 1964. The 1964 European catch was almost 800,000 tons above Europe's previous high of 8.89 million tons, caught in 1963. In 1964, Europe accounted for 19 percent of the world catch, the same percentage as in 1963. Only Asia with 19 million tons and South America with 11 million tons caught more fish than Europe on a Continental basis. Eight European countries were among the world's top 20 fishing nations.



Fig. 7 - Aboard a French stern trawler.

Norway was the leading European fishing country with a 1964 catch up more than 200,000 tons from 1963, but below Norway's record 1956 catch of 2,187,300 tons.

Second among the European nations was Spain, with a record catch and an increase of about 9 percent over 1963.

The Danish catch in 1964 showed a small gain over the 985,000 tons taken in 1963.

The United Kingdom's catch was up 23,400 tons from 1963, but well below her record catch of 1,206,100 tons in 1948.

Iceland brought in a record catch in 1964, well above her 784,500 tons of 1963, and topping by better than 140,100 tons her previous high of 832,600 tons in 1962. France also had a record 1964 catch. West Germany's 1964 catch was slightly down from 1963. Portugal

was the only other European nation to catch more than 0.5 million tons--her 1964 catch was also a record, surpassing by 63,900 tons the previous high of 1963.

Other European nations catching 100,000 tons or more in 1964 were: the Netherlands 387,800 tons, Sweden 372,100 tons, Poland 264,300 tons, Italy 252,400 tons, and East Germany 224,900 tons.

Soviet Union Lands Nine Percent of World's 1964 Fishery Catch: The Soviet Union caught a record catch in 1964, up almost 13 percent from 1963. The 1964 Soviet catch accounted for 9 percent of the world total. The Soviet catch has almost doubled during the past 10 years and is about triple what it was in 1948. It now is greater than the United States and Canadian catches combined.

Among the 15 Soviet Republics that make up the U.S.S.R., the Russian Soviet Federated Republic, which stretches from the Arctic Ocean to the Caspian and Black Seas and from Europe to the Pacific, traditionally brings in about three-quarters of the total Soviet catch. The Russian S.S.R.'s 1964 catch was 3,333,500 tons, compared with 3,014 tons in 1963.

The second most important Soviet fishing area is the Baltic, where the Estonian, Latvian, and Lithuanian Soviet Republics normally bring in yearly more than 100,000 tons each. The 1964 catches for those Soviet Republics were 163,500 tons, 269,900 tons, and 208,400 tons, respectively, compared with 138,600 tons, 210,600 tons, and 177,200 tons in 1963.

Another important Soviet fishing area is the Ukrainian S.S.R., whose ports are exclusively on the Black Sea. In 1964, that Republic had a catch of 256,600 tons, compared with 210,700 tons in 1963.

Catches of other Soviet Republics in 1964 were as follows: Armenian S.S.R. 1,000 tons, Azerbaijan S.S.R. 52,800 tons, Byelorussian S.S.R. 6,100 tons, Gruzian S.S.R. 21,000 tons, Kazakh S.S.R. 106,000 tons, Kirgiz S.S.R. 1,300 tons, Moldavian S.S.R. 1,300 tons, Tad-jik S.S.R. 300 tons, Turkman S.S.R. 31,500 tons, and Uzbek S.S.R. 22,500 tons.

African Fishermen Land Record Catch: The nations and territories of Africa caught a record 2.91 million metric tons of fish during 1964, up 250,000 tons from 1963. The 1964 African catch accounted for 6 percent of the world total.

International (Contd.):

The South Africa Republic (includes South-West Africa) was the leading African fishing country with a 1964 catch up 83,700 tons from 1963. Angola had the next largest African catch with 355,800 tons in 1964, compared with 239,800 tons in 1963.



Fig. 8 - Conveyor and labeling machine in a South-West Africa pilchard cannery.

In 1964, Morocco's catch was 203,800 tons, against 184,700 tons in 1963. Senegal's was 127,400 tons, an increase over the 1963 catch of 118,200 tons.



Fig. 9 - Fishing canoes on a beach in West Africa.

Other African countries catching more than 20,000 tons in 1964 were: Chad 80,000 tons (the same as in 1963); Ghana 79,100 tons (compared with 62,800 tons in 1963); Uganda 72,100 tons (69,600 tons in 1963); Nigeria 59,000 tons (the same as in 1963); Zambia 30,800 tons (28,600 tons in 1963); Dahomey 26,000 tons; Sierra Leone 21,500 tons; and Kenya 20,700 tons. Catch data in 1964 for the United Arab Republic, Tanzania, and the Republic of Cameroon are not available. (FAO Yearbook of Fishery Statistics, Catches and Landings, 1964.)

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EASTERN HEMISPHERE COUNTRIES SEND DELEGATES TO FAO-U.S.S.R. STUDY TOUR ON FISHERIES TRAINING:

For the benefit of governments and territories in the Eastern Hemisphere with devel-

oping fisheries, a seminar and study tour on Soviet fisheries training was organized in the summer of 1965 by the Food and Agriculture Organization (FAO) in cooperation with the Soviet State Committee for Fisheries.

The Soviet Government considers its fishing industry one of the most important branches of its national economy. Soviet fisheries not only provide protein foods and full employment in fishing areas, but also promote growth in Soviet heavy industry. An elaborate system of fisheries training has enabled the U.S.S.R. to rapidly develop a modern and effective high-seas fishing industry.



Fig. 1 - Opening meeting of FAO-U.S.S.R. Seminar and Study Tour on Fishermen's Training.

The seminar and study tour began on August 26, 1965, in Moscow where 23 participants from 14 countries and 5 FAO staff consultants spent 5 days hearing lectures which described the general system of education in the U.S.S.R., and introduced aspects of fishermen's training. The group then spent the following 10 days in the fishing ports of Murmansk and Kaliningrad visiting fishery schools, research institutes, fishing vessels, and fishing installations before returning to Moscow for discussions by the participants. The tour set the stage for the participants to draw up training programs to suit the various kinds of fishing vessels and levels of technical development in their home countries.

The tour included visits to processing plants for filleting, smoking, pickling, cooking, canning, and freezing various fishery products. The participants also saw a Soviet fishing gear plant that made various types of fishing nets for the fishing fleet.

International (Contd.):



Fig. 2 - Soviet Polar Research Institute of Marine Fisheries and Oceanography, Murmansk.

Soviet fisheries management was illustrated by visits to the administrative board for the northern fisheries basin of the U.S.S.R. at Murmansk (Sevriba) and the administrative board for Kaliningrad. Visits were made to some of the Soviet organizations responsible for research in various geographical areas: PINRO (Arctic, Norwegian Sea, White Sea, and Barents Sea); ATLANTNIRO (Baltic Sea, Atlantic Ocean, and North Sea); and VNIRO, which coordinates the research of other fishery institutes. Special meetings were held with gear research personnel at PINRO and ATLANTNIRO to discuss bottom and midwater trawls, acoustic equipment, and fish identification techniques.

Countries sending delegates to the seminar and study tour were: Ceylon, India, Iran, Israel, Japan, Malaysia, Nigeria, Senegal, Sierra Leone, Somalia, Sudan, Tanzania, Yugoslavia, and Zambia. A U. S. fishery expert attended as a consultant for FAO.

FISH MEAL

WORLD PRODUCTION, AUGUST 1965:

World fish meal production in August 1965 was down 18 percent from the previous month due mainly to the closed anchoveta season in Peru and seasonally declining output in South Africa.

World fish meal production in January-August 1965 was slightly less than in the first 8 months of 1964. Peru accounted for about 45 percent of total output in January-August 1965. Most of the principal countries producing fish meal submit data to the Interna-

World Fish Meal Production by Countries, August 1965 with Comparisons				
Country	August		Jan.-Aug.	
	1965	1964	1965	1964
. (Metric Tons)				
Canada	9,193	5,999	53,252	36,711
Denmark	14,475	16,398	79,921	69,951
France	1,100	1,100	8,800	8,800
German Fed. Repub.	6,706	7,757	44,867	50,655
Netherlands	488	700	3,863	4,700
Spain	1/	1/	2/13,247	1/
Sweden	408	581	4,890	4,411
United Kingdom	6,406	5,770	54,567	53,038
United States	36,730	30,414	3/160,612	159,051
Angola	2,818	4,199	26,561	35,697
Iceland	17,505	13,389	85,194	86,552
Norway	43,056	19,703	232,845	134,558
Peru	369	56,112	893,022	1,009,592
So. Afr. (including S.-W. Afr.)	17,271	24,480	250,093	214,492
Belgium	375	375	3,000	3,000
Chile	3,703	6,161	50,845	103,459
Morocco	1/	4,200	2/1,100	13,250
Total	160,603	197,338	1,966,679	1,987,917
1/Data not available. 2/Data available only for January-May 1965. 3/Revised. Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.				

tional Association of Fish Meal Manufacturers monthly (see table).

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PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-AUGUST 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-August 1965				
Country	August		Jan.-Aug.	
	1965	1964	1965	1964
. (1,000 Metric Tons)				
Chile	4.7	10.2	56.0	98.2
Angola	2.9	4.9	30.1	37.1
Iceland	16.2	11.4	80.5	77.8
Norway	30.3	9.4	147.5	130.4
Peru	46.5	104.4	1,076.0	1,016.4
So. Africa (including S.-W. Africa)	22.1	23.1	154.8	150.2
Total	122.7	163.4	1,544.9	1,510.1

Peru accounted for about 70 percent of the 1.5 million metric tons of fish meal exported by FEO countries in January-August 1965.

International (Contd.):

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-August 1965

Country	August		Jan.-Aug.	
	1965	1964	1965	1964
	. . . (1,000 Metric Tons). . .			
Chile	3.7	6.2	50.8	103.5
Angola	2.8	4.2	26.6	35.7
Iceland	17.5	13.4	85.2	86.5
Norway	43.1	19.7	232.8	134.6
Peru	0.4	56.1	893.0	1,009.6
So. Africa (including S.-W. Africa) . .	18.2	23.7	249.9	213.1
Total	85.7	123.3	1,538.3	1,583.0

INTERNATIONAL NORTH PACIFIC
FISHERIES COMMISSION

12TH ANNUAL MEETING:

The 12th Annual Meeting of the International North Pacific Fisheries Commission (made up of representatives from Canada, Japan, United States) held at Seattle, Wash., was concluded November 12, 1965. The Commissioners representing each country spent a week in daily plenary and committee sessions studying the conservation problems of the international fisheries of the North Pacific. Two weeks of scientific committee meetings preceded the plenary sessions and furnished the reports and data on which the Commission based its deliberations.

The Commission reviewed the results of conservation programs and scientific research on North Pacific fishery resources and discussed their implications for the fishing industries of the three countries. Each national delegation included a large number of scientific and industrial advisors and government fishery administrators who assisted the Commissioners in their task of ensuring that the valuable fishery resources of the North Pacific continue to be developed with due regard to the requirements of conservation.

As in the past two years, the Commission did not recommend at this meeting any change in the stocks of fish which are subject to the "abstention" provisions of the North Pacific fisheries convention.

A major task of the Commission at this meeting was to recommend to the Contracting Parties conservation measures for the

halibut fishery in the Bering Sea, in which fishermen of all three countries participate. The stringent controls recommended for that fishery in 1964 were continued with only a two-day extension of fishing time over the seven-day open season of 1965. The legal size for halibut and other conservation measures were also included in the Commission's recommendations for the Bering Sea fishery. The area of the northeastern Bering Sea will remain open until November 15, 1966, for exploratory and experimental long-line fishing for halibut.

The Commission also studied the effects of the trawl fisheries for other species on the halibut stocks in the Gulf of Alaska. The Commission recommended more intensive research on that problem and noted that efforts are being made to minimize the incidental catch of halibut in that area.

In response to requests from the Governments of Japan and the United States, the Commission will continue its studies on Bering Sea king crab and will report the results to those two governments for their guidance in drawing up conservation measures for the crab fishery. The Canadian members of the Commission also expressed an interest in that fishery and requested that their government be kept informed of the results of research on the king crab stocks.

The matter of the high-seas salmon fishery in the area of intermingling of Asian and North American stocks west of 175° W. longitude was discussed. No agreement was reached concerning that problem.

The Commission reviewed at the 12th Annual Meeting the progress of publication of its scientific reports and noted that a number of major studies on salmon had been added to its list of bi-lingual bulletins during 1965. A nine-part comprehensive report on salmon of the North Pacific, written jointly by scientists of the three countries, will be one of the Commission's major contributions. This report is nearly completed and is scheduled for publication some time in 1966.

The 13th Annual Meeting of the International North Pacific Fisheries Commission will be held in Vancouver, B.C. The new chairman will be A.W.H. Needler of Canada, with Iwao Fujita of Japan as vice-chairman, and Edward W. Allen of the United States as secretary.

Note: See Commercial Fisheries Review, January 1965 p. 56.

International (Contd.):

INTERNATIONAL COUNCIL FOR
THE EXPLORATION OF THE SEA53RD STATUTORY MEETING IN ROME:

The 53rd Statutory Meeting of the International Council for the Exploration of the Sea (ICES) was held in Rome, October 3-13, 1965. About 160 delegates and experts attended from the 16 Member Countries (Denmark, Finland, France, Iceland, Ireland, Norway, Spain, Sweden, the United Kingdom, West Germany, the U.S.S.R., Belgium, Italy, Netherlands, Poland, and Portugal). Total attendance was about 220 persons including observers from many nonmember countries. About 20 committees and several additional working groups considered about 170 papers in separate meetings and presented their reports to the 7-man Bureau of ICES.

ICES acts as scientific adviser to the Northeast Atlantic Fisheries Commission (NEAFC) through a special Liaison Committee. In the past, ICES has confined itself largely to the eastern part of the North Atlantic, primarily off Europe and Iceland. However, a new proposed ICES Convention, drawn up in 1964 and now awaiting complete ratification, would broaden the scope of ICES.

The 53rd Statutory Meeting of ICES began with a joint meeting with the International Commission for the Northwest Atlantic Fisheries (ICNAF) to discuss ways of achieving greater uniformity in sampling and measuring fish during fishery surveys. Such standardization is of interest to all those concerned with the management of North Atlantic fisheries.

The main work of the ICES Annual Meeting was carried out during the sessions of various permanent and ad hoc committees. A Comparative Fishing Committee recommended that more countries should experiment with cod-ends not needing top-side strengthening and large mesh chafers. That committee also asked for research reports on hydroacoustic methods from all Member Countries at the next ICES Meeting.

Of particular interest was the work of committees concerned with herring and salmon.

Herring: In view of the spectacular development of herring fisheries in the northern

part of the North Sea, it was recommended that:

Member countries should compile complete herring statistics and intensify sampling; an international tagging program should be launched; and a "Symposium on the Herring and Herring Fisheries in the Northern North Sea" should be held one day prior to the 1966 ICES Meeting. The Joint Norwegian-Soviet Investigation in the Barents Sea and adjacent waters should be continued and extended, and similar investigations should be conducted in Icelandic waters and on the Continental Slope from the British and Faroese Isles to the Norwegian Deep. The International Young Herring Service should be revived in the spring of 1967.

Salmon: The fishery for Atlantic salmon off West Greenland stirred wide general interest at the ICES Meeting. The Greenland inshore salmon catch increased from 15 metric tons in 1959 to 1,400 tons in 1964. A smaller Greenland salmon catch was forecast in 1965, due mainly to a diversion of fishing effort to other species. (See page 75 of this issue.)

Tag recoveries indicate that the Greenland salmon catch includes some fish spawned in rivers of Europe and North America. Salmon taken off Greenland have been quite fat, indicating they have been in or passed through an area of abundant food. Scientists at the ICES Rome meeting were in general agreement that more information is needed on the nature of Atlantic salmon stocks before any sound recommendations on management of the fishery can be made. It appeared especially important to tag salmon caught in Greenland to determine whether they return to home rivers in Europe and North America and, if so, in what numbers. The scientists also pointed out the need to further investigate the absence of Norwegian tagged salmon in the Greenland catches. During 1958-1965, Norway tagged 61,833 young salmon, 512 spawning salmon, and 7,435 "clean" salmon. The failure to recover any of those tagged salmon off Greenland may indicate the existence of some other important feeding area to which North Atlantic salmon migrate.

The discussion at the ICES meeting intensified interest in the proposed salmon research program previously drawn up by the Assessment Subcommittee of the International Commission for the Northwest Atlantic Fisheries

International (Contd.):

(ICNAF) at its June 1965 meeting in Halifax. The ICNAF Assessment Subcommittee had pointed out that present data are insufficient to determine what effect, if any, the Greenland salmon fishery is having on "home" fisheries. To determine the influence of the Greenland fishery, studies should be planned to find out the potential yield of the salmon stocks in Europe and North America, taking into account estimated natural losses at sea.

The ICNAF Assessment Subcommittee recommended the following studies in affected areas of North America, Europe, and Greenland: (1) collection of monthly salmon catch and fishing effort data, preferably by river of origin; (2) sampling of catches for length, weight, and age data; and (3) tagging of salmon as intensively as possible. It was also recommended that efforts should be made to identify the North American and European components of the Greenland catch by analyzing various biological characteristics.

Those ICNAF recommendations were endorsed by the ICES Salmon and Trout Committee, which also proposed a joint ICNAF/ICES Working Party on Atlantic Salmon. The proposed joint Working Party, composed of a representative from each concerned member country, would review, plan, and report on Atlantic salmon research. It was recommended that the proposed Working Party should meet in Spain in May 1966 prior to the ICNAF meeting for 1966.

Cooperation With International Organizations: It was recommended that: (1) ICES should participate in the SCOR/UNESCO Working Group on Carbon 14 Methods, and inform the Scientific Committee on Ocean Research (SCOR) of ICES work on intercalibration and standardization of chemical methods in oceanography; (2) a Working Group for a Joint Skagerrak Sea Expedition in 1966 should be established by ICES in cooperation with the Intergovernmental Oceanographic Commission (IOC) and SCOR; (3) ICES and ICNAF groups should explore the possibilities of preparing a "List of Fishing Craft Fishing in the North Atlantic"; (4) ICES should request the Food and Agriculture Organization (FAO) to keep ICES informed of progress on its "World Fishing Craft Register" for vessels over 500 GRT; (5) ICES should initiate through FAO a worldwide study of methods used and problems in-

involved in collection of fishery statistics from long-distance factory-trawler fleets, meanwhile Member countries should introduce effective systems; and (6) ICES should encourage UNESCO and SCOR to organize a "Symposium on the Hydrodynamics of Plankton Nets" to meet in Australia early in 1966.

Miscellaneous Symposia: In addition to those mentioned above, the ICES Meeting proposed future symposia on the following subjects: (1) "Ecology of Pelagic Fish Species in Arctic Waters" (principally capelin, silver smelt, smelt, and small gadoids)--scheduled immediately prior to the 1966 Meeting of ICES in Copenhagen; (2) "Study of Living Resources of the African Atlantic Continental Shelf, the Stocks of Such Resources, and Their Fisheries Between the Straits of Gibraltar and Cape Verde"--scheduled to be held in Spain in June 1967, subject to information available in 1966; (3) "Herring Recruitment"--scheduled to be held in 1968; and (4) "Food Chains in the Sea"--scheduled to be held in 1968.

ICES Meeting in 1966: The 54th Statutory Meeting of ICES will be held in Copenhagen, October 4-12, 1966.

New ICES Convention: On September 12, 1964, delegates from 15 Member Countries of ICES--Portugal was unrepresented--signed a Final Act of the Conference on ICES, providing for a new Convention for the International Council for the Exploration of the Sea. As of November 1, 1965, the new Convention had been ratified or approved by deposition of documents with Denmark by Denmark, Finland, Federal Republic of Germany, France, Iceland, Ireland, Norway, Spain, Sweden, the United Kingdom, and the U.S.S.R. At that time, Belgium, Italy, the Netherlands, Poland, and Portugal had not yet ratified the Convention. The Convention enters into effect on the July 22 next following ratification or approval by all signatory Governments. However, if that has not occurred by January 1, 1968, it may enter into force by mutual agreement if not less than three-fourths of the Governments have ratified or approved it. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, October 11 and November 17, 1965, and other sources.)

Note: See Commercial Fisheries Review, December 1964 p. 80.

INTERNATIONAL LABOR ORGANIZATION

MEETING ON CONDITIONS OF WORK IN THE FISHING INDUSTRY:

A preparatory Technical Conference on Fishermen's Questions was held October 18-

International (Contd.):

28, 1965, by the International Labor Organization (ILO) at its headquarters in Geneva, Switzerland. (ILO is a United Nations specialized agency devoted to improving the lot of the workingman.) Fifteen nations, including the United States, sent delegations; there were observers from three other nations and several international organizations such as FAO, IMCO, etc. The three subjects concerned with conditions of work in the fishing industry considered at the meeting were: (1) vocational training of fishermen; (2) crew accommodation on board fishing vessels; (3) certificates of competency.

Draft instruments on the three subjects were prepared and will be presented to the ILO Conference which meets in June 1966.

Vocational Training: Vocational training of fishing vessel personnel was the first subject discussed. After the election of officers and the organization of the Conference on October 18, a member of the ILO staff made opening comments on the subject. He summarized the principles which were involved and made suggestions as to how the Conference might proceed. Representatives of employer, worker, government, and observer delegations made statements regarding the aims, objectives, and methods of vocational training. Then, a working party prepared a draft instrument which makes recommendations on various aspects of vocational training and which was approved by the Conference. Such things as planning, administration, financing, training standards, types of programs, methods of training, and international cooperation are covered in the draft instrument.

Accommodation on Board Fishing Vessels: This was the second subject taken up by the Conference. On October 20, initial discussions were begun in the plenary session. A member of the ILO staff described the history of ILO's work concerning crew accommodations on both merchant and fishing vessels. Representatives of the worker, employer, government, and observer delegations offered their views and made suggestions for improving the draft instrument which had been prepared by the 1962 Committee on Conditions of Work in the Fishing Industry convened by ILO. This Committee's draft was in the form of a proposed international convention, but it left open the specific minimum tonnage of

vessel below which its provisions would not be applicable.

A second working party of the Conference then began the review of the draft instrument on accommodations. In the opening discussions of the working party, the workers' spokesman requested that the draft instrument take the form of a convention and that it be applicable to all fishing vessels 25 gross tons and larger. However, he did indicate that they might accept a limit of 50 tons if this would facilitate an agreement. The employers countered that they were not convinced the instrument should be a convention and that they were for a 100-gross-ton minimum. Then the workers' vice-chairman turned to the government members and asked them to state their opinions. The government members from the United Kingdom and Denmark (who were naval architects) strongly asserted that the provisions in the proposed draft instrument on this subject could not be applied reasonably to a fishing vessel under 100 gross tons. Necessary cargo space, stability of the vessel, and other factors made a 25- to 50-gross-ton minimum impractical. The United Kingdom also indicated a preference for a minimum level of 80 feet in length which was roughly 100 gross tons in size.

The United States member indicated that its representatives at the 1962 Committee meeting had stated a preference for the 100-gross-ton minimum and that after review by technicians there was no reason to change that position. However, if the Conference decided on a different minimum tonnage to exempt small fishing vessels, the United States would work constructively with the majority provided that all subparts of the draft instrument called for crew accommodations which could be reasonably accomplished from a technical standpoint on a vessel of the size specified. It was also indicated that the United States preferred the recommendation form of instrument but would also work constructively with the group if a majority favored the convention form. The naval architects from the United Kingdom and Denmark were then asked to meet separately with a few of the workers' and employers' representatives to thoroughly review this problem.

On October 22, after the select group had reported back to the working party, it was decided to provide for a 75-gross-ton minimum with the provision that the instrument may be applied to vessels between 25 and 75 gross

International (Contd.):

tons where the competent authority determines after consultation with the fishing vessels owners' and fishermen's organizations, where such exist, that this is reasonable and practicable. Then the employers acceded to the workers' desire to prepare the instrument in the form of a convention and with no dissent from any of the members present it was agreed to unanimously. (Later in plenary it was also agreed the proposed instrument would not be applicable to vessels and boats which normally remain away from port for periods of less than 36 hours and in which the crew does not live on board.) Then the technical aspects of the wording of all the other principal subparts of the instrument were completed. The revised draft instrument was presented to the Conference and except for some minor revisions was approved. The draft instrument details specifications for sleeping rooms, including size of bunks, lockers, etc., galleys, messrooms, and sanitary accommodations, including wash basins, tub and/or showers, and water closets. The specifications would apply to all new or reconstructed fishing craft except the smaller exempt sizes.

Certificates of Competency: This was the third subject considered. After an initial presentation by the ILO staff which also referred to ILO Convention No. 53 concerning the Minimum Requirement of Professional Capacity for Masters and Officers on Board Merchant Ships, the subject was given to the first working party to iron out technical details of a proposed draft instrument. There was a prolonged debate in the working party as to the size of vessel on which the licensing requirements would be applicable. The workers group insisted on 25 gross tons and larger. The United States Government delegate and employer's delegate objected. Then reservations were made by those two delegates which appeared in the record and show that in the United States, officers are certified only on board fishing vessels of over 200 gross registered tons.

In many northern European countries certification is already required for officers on smaller fishing vessels. A majority of the nations indicated approval of the 25-gross-ton minimum, and the draft instrument was presented to and approved by the Conference with that exemption provision. The draft instrument covers skippers, mates, and engineers. It prescribes minimum age of person-

nel, requirements for examinations, and enforcement requirements.

Summary: Each of the draft instruments will now be considered by the 1966 ILO Conference. They will be voted on and if approved will be sent to member nations for ratification. When this occurs, the instruments will have to be approved by the U. S. Senate if they are subject to ratification, at which time the public will have an opportunity to present its views.

NORTH AMERICA

SHARE OF WORLD FISH CATCH DROPS IN 1964:

The North American countries caught less fish in 1964 than in the year before--4.28 against 4.37 million metric tons--and 8 rather than 9 percent of the world total, according to the Food and Agriculture Organization (FAO). For fishery statistical purposes, FAO classifies Central America, Greenland, and the Caribbean Islands as well as Canada, Mexico, and the United States as North American countries. North America's percentage of the world catch has dropped consistently since 1948, when it was 19 percent of the world total.



The United States catch in 1964 was 2,638,000 tons, a drop of 138,700 tons from

International (Contd.):

1963. In terms of catch, the United States still ranked fifth among the world's fishing countries.

Canada's catch was a record 1,210,700 tons, up 13,300 tons from 1963. Canada ranked ninth among fishing nations in 1964 compared with seventh in 1963.

Mexico also reported a record catch of 258,400 tons as compared with 244,300 tons in 1963.

Greenland's 1964 catch came to 38,300 tons, an increase over 1963's 33,300 tons, but less than the record 43,300 tons caught in 1962.

Cuba reported a new high of 36,300 tons compared with her 1963 catch of 35,600 tons. Panama's 25,600 tons was almost double the 13,400 tons of 1963. Jamaica also reached a new high of 16,000 tons compared with 13,900 tons in 1963. All other North American countries and territories caught less than 10,000 tons. (FAO Yearbook of Fishery Statistics, Catches and Landings, 1964.)

NORDIC COUNTRIES

NEW FISHING LIMITS RECOMMENDED:

In October 1965, Nordic fishing industry organizations of Denmark, Norway, and Sweden met in Stockholm and recommended an extension of international fishing limits to 12 nautical miles. However, the Nordic associations also proposed that their own fishing vessels should be subject to fishing limits of only 4 miles in Nordic waters of Denmark, Norway, and Sweden. The Governments of those countries were expected to give prompt consideration to the industry recommendations.

The extension of fishing limits to 12 nautical miles by Denmark and Sweden in the Kattegat Sea would practically exclude fishing by the Soviet, Polish, and East German fleets which have been actively fishing for herring in that area in recent years. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, October 21, 1965.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 48, and Sept. 1964 p. 54.

SALMON

PACIFIC FISHERIES DISCUSSED AT UNITED STATES-CANADIAN MEETING:

United States and Canadian fishery experts from Government and industry met in Washington, D. C., October 12-14, 1965, to exchange preliminary views on problems of mutual concern related to United States and Canadian coastal fisheries on the west coasts of the two countries. Technical consultants from the International Pacific Salmon Fisheries Commission were also present.

Discussions centered on problems arising from the intermingling in the United States and Canadian salmon fisheries off southeastern Alaska and northern British Columbia of salmon bound for both Canadian and United States streams; and on the adequacy of the provisions of the 1956 Protocol to the 1930 Sockeye Salmon Convention, which brought pink salmon in the Convention area within the responsibilities of the International Pacific Salmon Fisheries Commission.

Delegates to the meeting in Washington in October 1965 made no specific proposals. However, tentative agreement was reached on a further meeting on those two questions in the spring of 1966 in Ottawa when specific proposals for joint action will be considered. Joint United States-Canadian committees of scientists have been appointed to examine and report on technical aspects of those problems. (U. S. Department of State, October 14, 1965.)

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

ANNUAL MEETING ANNOUNCED:

The International Pacific Salmon Fisheries Commission announced that its Annual Meeting would be held in Bellingham, Wash., on December 17, 1965. On that date the Commission expected to meet with its Advisory Committee and the public to report on the 1965 Fraser River sockeye and pink salmon runs and to discuss prospects for the 1966 sockeye run.



Australia

SPINY LOBSTER PRODUCTION DROPS IN FY 1964/65:

Australia's spiny lobster catch in fiscal year 1964/65 (July 1-June 30) was estimated to be 26.6 million pounds (live weight), about 1.3 million pounds less than the previous year. Most of the drop was in the State of Western Australia, the main producing area. That State's catch was estimated at 17 million pounds, or about one million pounds below 1963/64.

About 14 million pounds of the Western Australian catch was from the coastal fishery as compared with 15.1 million pounds in the previous year. Production in that State's Abrolhos area increased from 2.9 million pounds in 1963/64 to 3.1 million pounds in 1964/65. The weather in March 1965, when the Abrolhos season opened, was much more favorable than in 1964 which permitted fishing on some reefs not previously accessible.

The spiny lobster catch in the State of South Australia was estimated at more than 4.8 million pounds, and could be a record, according to the South Australian Director of Fisheries and Fauna Conservation. Favorable weather and a larger fleet during 1964/65 accounted for the increase.



Two larger specimens of Australian spiny lobster.

The catch in Tasmania was estimated to have been about 3.2 million pounds, a drop of 400,000 pounds from the previous year. Ad-

verse weather during the main fishing season was believed partly responsible for the decline. The number of new spiny lobster fishing grounds located during the year also was less than in previous years.

The catch in Victoria for 1964/65 was estimated at about 1.2 million pounds, a drop of 5.8 percent from the previous year. Spiny lobster catches in other waters were up from the previous year. (*Australian Fisheries Newsletter*, October 1965.)

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SHRIMP FISHERY TRENDS, FISCAL YEAR 1964/65:

Australia's total shrimp landings in fiscal year 1964/65 (July-June) amounted to 12.6 million pounds, down only slightly from the record 13.0 million pounds landed in 1963/64. The trend has been upward in the past 10 years, with shrimp landings almost doubled since 1954/55.

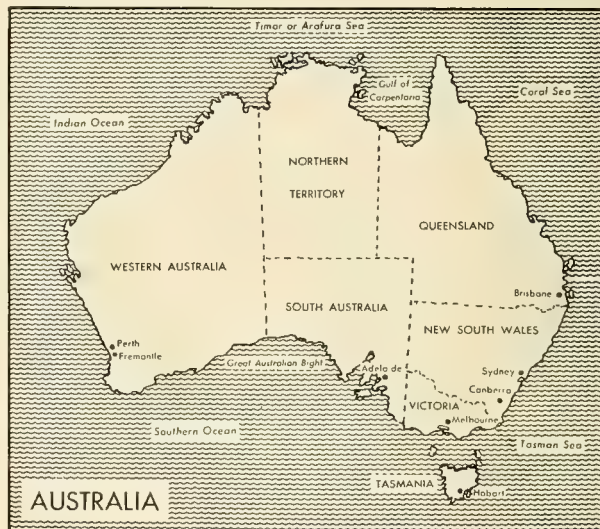


Fig. 1 - Map of Australia.

The principal shrimp-producing states are: Queensland with landings in 1964/65 of 5.7 million pounds; New South Wales, 4.4 million pounds; and Western Australia, 2.5 million pounds. Landings for other states (Victoria and Northern Territory) were not available but are not likely to make any significant difference in the total.

The 1964/65 shrimp landings in Queensland were up 12 percent from the previous year due largely to the development of the

Australia (Contd.):

fishery in deeper waters off the southern Queensland coast. Those grounds have produced giant king shrimp, most of which are exported.

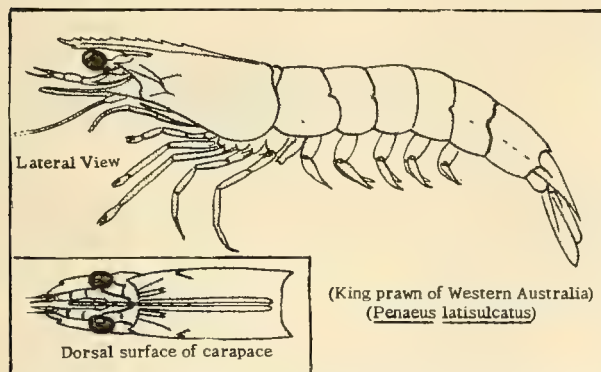


Fig. 2 - King prawn (*Penaeus latisulcatus*) of Western Australia.

Western Australia's shrimp landings were up 18 percent from 1963/64 because of development of the shrimp fishery in northern waters of that state which also produces large shrimp for export.



Fig. 3 - Australian shrimp trawler.

Shrimp landings of 4.4 million pounds in New South Wales dropped 28 percent from the 6.1 million pounds in 1963/64. Shrimp production of that state is about evenly divided between the estuarine and inshore fisheries that yield smaller shrimp which are mainly consumed locally and the deep-sea fishery which produces larger shrimp, the bulk of which is exported. In 1964/65, shrimp landings were down for all those fisheries.

Drought conditions in the estuaries were believed responsible for the drop in the New South Wales estuarine shrimp catch, and also affected the movement of shrimp stocks to the offshore shrimp grounds resulting in lower catches by trawlers. When drought conditions there ease, it is believed that shrimp landings in that state will resume the upward trend which started in 1961. Combined with efforts being made to develop a shrimp fishery in northern Australia, it is anticipated that shrimp production will increase in the future. (*Australian Fisheries Newsletter*, November 1965.)

Note: See *Commercial Fisheries Review*, November 1965 p. 46.

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RESULTS OF SHRIMP SURVEY OFF NEW GUINEA:

A fisheries survey vessel operated by the Australian Federal Government Fisheries Division returned to Madang in October 1965 after completing a two-week shrimp survey in the Ramu River area of New Guinea. The vessel caught 1,800 pounds of shrimp from about 95 short trawls. The catch included banana (*Penaeus merguensis*) and tiger (*Penaeus esculentus*) shrimp, red-tailed and green shrimp, and a new unidentified bluish-green hardback type of shrimp.

The best fishing areas found during the survey were north and south of the river at distances up to three miles from shore. At times trawling was difficult because strong tides dragged the trawl nets and caused "mudding up," and an accumulation of mud at the river mouth put added strain on the trawl nets. (*Australian Fisheries Newsletter*, November 1965.)



Canada

BRITISH COLUMBIA HERRING FISHERY LABOR NEGOTIATIONS:

British Columbia herring fishermen were reported to be asking processors to pay C\$20.48 per short ton for herring landed during the 1965/66 season (as compared with C\$14.48 paid in 1964/65).^{1/} The fishermen also asked the processors to provide vacation pay, contribute to a pension plan, and increase contributions to medical and welfare plans.

The fishermen and processors had not reached an agreement by mid-October 1965. The fishermen then declared a 2-week holiday from fishing during October 17-31, 1965.

A work stoppage on herring vessels employed in operations of the British Columbia Fisheries Association was approved November 1, 1965, by the British Columbia United Fishermen and Allied Workers Union.

Meanwhile, in Prince Rupert, British Columbia, a share agreement was reached covering most of the herring vessels employed in operations of the Prince Rupert Fishermen's Cooperative Association. (Editor's Note: The Prince Rupert Coop is at least partly a Union operation. Therefore, the Prince Rupert agreement was, in effect, a negotiation between fishermen and vessel owners, rather than a negotiation between fishermen and processors.) The Prince Rupert agreement provides the vacation and welfare benefits asked by fishermen and gives the fishermen 56 $\frac{1}{4}$ percent of the net proceeds from the sale of processed herring after operating and overhead costs of the Coop are deducted. The settlement at Prince Rupert cleared the way for herring vessels in that area to resume fishing in early November. The Prince Rupert herring fishermen were to contribute part of their earnings after December 1, 1965, to the Union's emergency fund, if the herring labor dispute elsewhere in British Columbia was not settled by that date. (The Fisherman, Vancouver, B.C., November 5, 1965.)

^{1/}Editor's Note: Ex-vessel prices for herring in British Columbia are not comparable to prices in certain other countries because British Columbia processors furnish much of the equipment used in the fishery.

Notes: (1) US\$1.00 equals Canadian \$1.08.

(2) See Commercial Fisheries Review, Feb. 1965 p. 53.

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NOVA SCOTIA LOBSTER FISHERMEN RECEIVE GOVERNMENT AID FOR STORM DAMAGE:

The Canadian Federal Government and the Nova Scotia Provincial Government have each provided \$16,000 to assist lobster fishermen in Halifax and Guysborough Counties, Nova Scotia, who suffered heavy losses due to storms during 1965. (Canadian Department of Fisheries, Ottawa, October 21, 1965.)

* * * * *

NEW CHART OF FISHING BANKS SOUTHEAST OF NOVA SCOTIA:

On October 19, 1965, the Canadian Hydrographic Service announced Chart No. 4040, covering fishing grounds south and east of Nova Scotia to Sable Island (including Sambro Bank, Emerald Bank, Western Bank, Middle Bank, and Sable Island Bank). Detailed contour lines are a feature of the new chart.

Drawn on a scale of 1:300,000, or about 4 miles to the inch, the new chart illustrates depths primarily by blue contour lines. The contour lines on the chart are spaced at 10-fathom intervals to a depth of 100 fathoms, at 20-fathom intervals to 200 fathoms, and at every 100 fathoms to a depth of 1,000 fathoms. The small contour interval clearly outlines the edges of the fishing banks. It also reveals for the first time the exact position and shape of such features as "The Owl," "The Cow Pen," and "The Patch."

The new chart is the second of its type to be issued by the Canadian Hydrographic Service. The first, No. 4041, covers the Atlantic Coast banks of Banquereau and Misaine, which lie off Nova Scotia between Scatarie and Sable Islands. As an added feature, Chart No. 4040 shows the location of cables in the area and Armed Forces exercise areas.

The new chart is available in two versions: L(D7)4040 which shows the Decca lattice for Nova Scotia chain 7, and 4040-L which shows the three Loran-A rates covering the area. Each is priced at \$2.00 and may be obtained from Canadian chart dealers or from Hydrographic Chart Distribution, Canadian Department of Mines and Technical Surveys, Ottawa, Canada.

Note: See Commercial Fisheries Review, Nov. 1964 p. 79.

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Canada (Contd.):

NEW FISH-PROCESSING PLANT TO BE BUILT IN SHIPPIGAN, NEW BRUNSWICK:

A \$1 million fish-processing plant capable of handling 20 million pounds of fresh fish each season will be built in Shippigan, New Brunswick, by a large Canadian fishery firm. It will replace the company's former processing plant on the same site which was destroyed by fire in August 1965, according to a Halifax newspaper. The announcement, was made jointly by the firm's chairman and the New Brunswick Minister of Fisheries. New Brunswick's Department of Fisheries and Industrial Development Board are assisting the company's rebuilding program.

It is hoped that the plant will be operative in time for the spring 1966 fishing season. The new plant which will be equipped with the most recently developed machinery available to the Canadian fish-processing industry, will employ 175 men and women to start--about the same number employed in the former plant. The number of plant workers is expected to increase as production rises. Plans call for a fish meal plant capable of processing 10 tons of raw fish an hour to be incorporated with the new filleting plant. (United States Embassy, Ottawa, November 15, 1965.)

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NEWFOUNDLAND FISHERIES AIDED BY NEW BAIT-HOLDING UNITS:

Nine additional bait-holding units are being established to make bait more readily available to commercial fishermen in Newfoundland settlements. Forty-eight such establishments are already being operated in the Province by the Newfoundland Bait Service of the Canadian Federal Department of Fisheries. The new units will be located at Petty Harbour, Cow Head, Pass Island, Point Rosie, Fogo, Winterton, Cooks Harbour, and Forteau. In addition, a holding depot will be set up at West St. Modeste with freezing facilities and a holding capacity of 100,000 pounds of bait. It will be able to supply bait to the smaller units in adjacent areas when necessary, as well as to local fishermen. The depot, which is to cost about \$56,000 to build, is expected to be in operation early in 1966.

The bait-holding units extend the fishing season in areas where lack of bait has restricted fishing operations. The units are

supplied with frozen bait by refrigerated trucks and the M/V Arctica, the Bait Service's refrigerated vessel.

Since 1949, when the Newfoundland Bait Service was transferred to the Canadian Federal Government, the number of distribution outlets has been increased from 20 to 57, in order to extend the facilities to areas where sufficient bait was not previously available from private or public sources. (Canadian Department of Fisheries, Ottawa, October 21, 1965.)

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NEWFOUNDLAND SEEKS JAPANESE HELP TO DEVELOP OFFSHORE FISHERY:

Newfoundland's Provincial Government was reported seeking Japanese participation in developing its offshore bottom fishery. Reportedly, a formal request for Japanese technological assistance was made by Newfoundland's fishery delegation at the completion of a three-week Japan tour sponsored by a large Japanese fishing company and fish net manufacturing firm. Newfoundland was said to be primarily seeking to develop its offshore cod and herring fisheries, and showed particularly keen interest in developing the abundantly available but unused resources, such as herring roe, for export to Japan. (Suisan Keizai Shimbun, November 3, 1965.)

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CONFERENCE ON ATLANTIC OFFSHORE FISHING VESSELS:

A Canadian Atlantic Offshore Fishing Vessel Conference will be held February 7-9, 1966, in Montreal, P. Q., Canada. It is sponsored by the Federal-Provincial Atlantic Fisheries Committee made up of Deputy Ministers of Fisheries of the Canadian Federal government and the five Atlantic coast provinces. Naval architects and government officials from Canada, the United States, and Europe, and operators of large fishing vessels will attend.

The Canadian Atlantic deep-sea fishing fleet is undergoing rapid expansion, and there is a need for vessel designs suited to the specific requirements of the offshore fisheries. This, together with a need for improving living and working conditions for Canadian fishermen in the light of the progress being made by shore industries, has prompted the conference. It will be the first opportunity for rep-

Canada (Contd.):

representatives of all groups with an interest in offshore fishing to discuss the problems of deep-sea operations in the Northwest Atlantic.

Between 25 and 30 papers will be presented. Some of them will deal with mechanized fishing operations, navigation and propulsion systems, fish processing and handling equipment on board ship, and vessel design.

The fishing industry's viewpoint on the development of Canadian Atlantic offshore fishing vessels will be given by representatives of fishing companies. Naval architects, engineers, and builders will discuss combination side trawlers and purse seiners, wooden and steel side trawlers, fish carriers, vessel stability, the comfort of fishermen, and layout of accommodation on fishing vessels. Steel stern trawlers, particularly those of Canadian design, will be the subject of several papers. Factory trawlers, motors, deck machinery, and automation generally will also be discussed, and there will be papers on scallop draggers, sealing and whaling vessels, fish holds, the economics of fishing vessels, and the relationship between such economics and naval architecture.

The chairman of the conference will be Dr. A.W.H. Needler, Deputy Minister of Fisheries of Canada. He and the provincial government officials on the committee will speak on the development of Canadian offshore fishing operations in the Atlantic. (Canadian Department of Fisheries, Ottawa, November 10, 1965.)

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FISHERIES TRADE MISSION VISITED ITALY, SPAIN, AND PORTUGAL:

A 5-man fisheries mission left Canada October 22, 1965, for a 20-day tour of Italy, Spain, and Portugal. Sponsored by the Canadian Department of Trade and Commerce, the mission assessed the long-term export possibilities for Canadian fishery products in those countries. The three countries are important customers for Canadian salt cod.

The mission also examined fishery developments in Italy, Spain, and Portugal and studied their respective methods of production and marketing.

The mission planned to prepare a report of its findings for distribution to the Canadian fisheries industry. (Canadian Department of Trade and Commerce, October 21, 1965.)



Chile

FISHERY TRENDS, THIRD QUARTER 1965:

As a result of continued poor anchoveta fishing throughout the third quarter of 1965, Chilean fish meal production in the first 9 months of 1965 totaled only 51,906 metric tons. That was 75,000 tons less than in the same period in 1964, and some 25,000 tons below 1963. More than 25 plants, 250 vessels, and several thousand workers have been largely idled by the continued anchoveta shortage. The financial position of a number of firms is critical. More failures would certainly result if loan payments were insisted on by the Production Development Corporation of Chile (CORFO) and foreign creditors.

As part of its program to tide the stricken industry over during the prolonged resource shortage, the Chilean Government has proposed new fisheries legislation that would (1) encourage integration among the firms and (2) allocate funds for the payment, in part, of export subsidies due under the 1960 Fisheries Law. However, those proposals were still waiting for final approval by the Chilean Legislature in late October 1965.

The prolonged period of depression in the anchoveta fishery has brought economic hardship to many. There are indications, however, that the bitter experience may help the future development of Chile's extensive marine resources. Fish meal firms threatened with closing have diversified into freezer and canning. Boatyards are successfully converting purse seiners into trawlers. New plants and supporting facilities are moving in along the central and southern Chilean coasts to catch and process shrimp and frozen hake fillets. The Government, as well as the industry, is in general adopting a more flexible attitude toward development of the fishing industry. In addition, the introduction of meatless days is having a pronounced effect on domestic consumption of fish (increases of 50 percent and more have been reported) which should assist in broadening the limited domestic market for fish and shellfish. All of those moves should brighten the long-range outlook for Chilean

Chile (Contd.):

fisheries. (United States Embassy, Santiago, October 29, 1965.)



Cuba

TRAWLERS AND TUNA VESSELS ORDERED FROM SPAIN:

The Cuban Government has ordered 20 tuna vessels and 6 bottomfish trawlers from Spanish shipyards. Specifications of the order call for trawlers of 800 to 1,000 gross registered tons and an overall length of 60 meters (197 feet). The 500-ton tuna vessels ordered are an improved version of the "Gipsa-type" vessel with refrigeration units.

Bilboa shipyards were reported to be building 18 of the tuna vessels; Vigo shipyards were to build 2 of the tuna vessels and all of the trawlers.

As of mid-October 1965, it was believed that none of those vessels had been delivered, although 5 of the tuna vessels and 1 of the trawlers had been launched. Construction had started on 7 or 8 of the remaining tuna vessels. (United States Embassy, Madrid, October 14, 1965.)



Republic of Dahomey

GOVERNMENT FORBIDS TRAWLING WITHIN 12-MILE FISHING LIMITS BY UNLICENSED FOREIGN VESSELS:

By law No. 65-10 of June 23, 1965, the Government of the Republic of Dahomey forbids trawling by unlicensed foreign vessels within Dahomean territorial waters, now set at 12 miles. It has been reported that foreign vessels based in Dahomey may obtain without cost the necessary license.

The law was apparently passed in anticipation of the development of a shrimp industry in the Gulf of Guinea off Dahomey. (United States Embassy, Cotonou, November 2, 1965.)



Denmark

FISHERY TRENDS, JANUARY-SEPTEMBER 1965:

Landings: Fishery landings in local ports by Danish vessels in the first nine months of 1965 were up 5 percent from the same period in 1964. Substantial increases in landings of cod, cod-like species, pond trout, shrimp, mussels, and industrial fish more than offset lower landings of flatfish, brisling, Norway lobster, and starfish. Landings by foreign vessels, mainly Swedish, were 11 percent higher. Total landings by foreign vessels could increase if the Danish Minister of Fisheries approves an industry request to permit Norwegian vessels to land industrial fish, primarily herring, in Danish ports. Landings by Danish vessels in foreign ports were below the same period in 1964 because of delays earlier in 1965 in landing their catches in English ports.

Ex-vessel prices for the main species landed continued mostly higher than in 1964. The combination of higher prices and increased landings point to a very profitable year for most Danish fishermen. Salmon prices and those for several other species were down from the higher prices in 1964.

Table 1 - Danish Fishery Landings, January-September 1965 with Comparisons

Species	January-September	
	1965	1964
.. (Metric Tons) ..		
Landings in Denmark		
by Danish vessels:		
Flatfish 1/.....	46,485	55,859
Cod	61,780	52,641
Cod-like fish 2/	55,962	38,137
Herring	258,601	256,185
Brisling	2,900	6,887
Mackerel.....	5,297	5,180
Eels	1,630	1,678
Salmon	936	777
Pond trout	8,248	6,405
Other fish 3/	208,187	196,250
Norway lobster	1,422	1,782
Shrimp	4,581	2,965
Mussels.....	12,299	11,058
Other shellfish	124	52
Starfish.....	1,819	2,449
Total.....	670,271	638,305
Landings in Denmark by foreign vessels.....	150,131	135,739
Total landings in Danish ports.....	820,402	774,044
Landings in foreign ports by Danish vessels	2,993	3,649
1/Plaice, flounder, dab, common sole, etc.		
2/Haddock, coalfish, hake, ling, etc.		
3/Mostly industrial fish such as sand eels, Norway pout, etc.		

Denmark (Contd.):

Pond trout prices in 1965 were also lower due to a sharp production increase.

Processing: Production of most processed fishery items was higher in the first nine months of 1965. The increased demands for frozen fish fillets and fish blocks from the

Table 2 - Danish Production of Processed Fishery Products, January-September 1965

Product	January-September	
	1965	1964
.. (Metric Tons) ..		
Canned:		
Herring & sprats	2,010	2,216
Mackerel	1,088	1,114
Other fish	3,298	3,800
Mussels	438	821
Other shellfish	1,206	351
Total	8,040	8,302
Semi-preserved:		
Herring & sprats	3,954	3,301
Other fish	347	305
Mussels	557	489
Total	4,858	4,095
Fresh & frozen fillets:		
Cod	21,475	17,871
Cod-like fish 1/	2,626	1,002
Plaice	13,852	14,108
Other flatfish	1,559	787
Herring	35,421	25,584
Other fish	104	163
Total	75,037	59,515
Smoked:		
Herring & sprats	1,700	1,554
Mackerel	1,466	1,486
Eels	502	520
Salmon & trout	558	345
Other fishery products	196	152
Total	4,422	4,057
Miscellaneous:		
Force meat 2/	1,437	1,259
Salted herring	121	92
Dry-salted cod	174	398
Other fishery products	1,323	5,731
Total	3,055	7,480
Industrial products:		
Meal	92,326	78,529
Oil	28,597	20,856
Ensilage 3/	4,172	6,106
Solubles	13,997	8,188
Total	139,092	113,679

1/Haddock, coalfish, hake, ling, etc.

2/Ground fish, milk, and flour.

3/Chemically treated raw fish.

Source: Ministry of Fisheries.

United States and herring fillets from West Germany resulted in more production of those products. Production of fish meal, solubles, and oil were up because more herring, sand eel, and other industrial fish were landed at

higher prices. Production of plaice fillets was off slightly as the supply of that species did not respond to a strong demand and higher prices. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, November 17, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 72; February 1965 p. 54.



Faroe Islands

BRITISH QUOTA ON FAROESE LANDINGS LIBERALIZED:

In March 1964, an unofficial quota on Faroese deliveries of iced and frozen fish to the United Kingdom was imposed by British fishing organizations. (The action followed the extension of Faroese fishing limits to 12 nautical miles.) Under that quota, the combined annual value of Faroese landings of iced fish in British ports and Faroese exports of frozen fish to Britain was limited to £850,000 (US\$2.38 million), and only one-quarter of that amount could be landed in any 3-month period. Landings in British ports from Faroese vessels had been rising rapidly and had reached a value in 1963 of £1.25 million (\$3.5 million).

The quota restrictions have been unpopular with British fish merchants, especially in the ports where Faroese vessels normally unload. Therefore, a British fishing industry committee signed a new agreement with the Faroese, effective October 1, 1965, for a 5-year period which raises the quota to £1 million (\$2.8 million) a year. Other major revisions in the quota include: (1) relaxation of the seasonal limitations to permit the entry of the entire quota between October and March, when British domestic landings are lightest; (2) changes in the species of fish that can be imported; and (3) removal of all quota restrictions on herring and salt fish landed in Britain for re-export.

The new agreement does not provide for a change in the Faroese fishing limits. It does, however, renew contacts between industry leaders of the two countries. (United States Embassy, London, October 21, 1965.)

Notes: (1) See Commercial Fisheries Review, May 1964 p. 49.
(2) British £1.00 equal US\$2.80.



France

PROMOTIONAL CAMPAIGN URGES INCREASED FISH CONSUMPTION:

A promotional campaign urging the French people to eat more fish was under way in October 1965 in 17 of the main cities and towns of France. The aim was to help the country's fishermen who were reported experiencing a poor demand for their catches.

By means of special announcements on television and radio, together with newspaper advertisements, it is hoped to persuade the French to eat fish on Tuesdays as well as on Fridays. (Fish Trades Gazette, October 16, 1965.)

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FISHERIES EXPOSITION PLANNED IN LORIENT, MAY 12-22, 1966:

An international fisheries exposition is scheduled to be held in Lorient, France, May 12-22, 1966. The exposition is designed to display fishing vessel designs and equipment, including the latest developments in engines, electronics, and refrigeration. Additional information may be obtained from Biennale Internationale des Peches, Chambre de Commerce et d'Industrie, Lorient (Morbihan) France.



German Federal Republic

FISH MEAL MARKET AT HAMBURG, OCTOBER 26, 1965:

The International Fish Meal Export Organization reported the following quotations in Hamburg, Germany, October 26, 1965, for fish meal futures (in dollars per metric ton): US\$190 for supplies afloat; \$193-194 for November 1965; \$191 for December 1965; and \$184-185 for January-June 1966. Hamburg sellers are reluctant to give monthly lots of more than 100 to 200 tons. On the other hand, quotations from Peruvian producers for January-June 1966 are \$191-194. Consuming countries outside West Germany are showing buying interest at those levels for fairly large monthly quantities. (Regional Fisheries Attache, United States Embassy, Copenhagen, November 3, 1965.)

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TWO NEW FACTORY TRAWLERS DELIVERED:

Exemplifying the trend towards large factory trawlers in the West German fleet are two new stern trawlers which were delivered in the fall of 1965 to owners at Bremerhaven and Hamburg by Bremerhaven shipyards.

The larger of the two is the Sagitta Maris, a 2,145-gross-ton vessel with an overall length of 78.3 meters (257 feet) powered by a 3,000-horsepower diesel engine giving a top speed of 16 knots.

The Sagitta Maris is an all-welded stern trawler capable of carrying fresh or frozen fish. In addition, the vessel can be equipped for herring fishing. She is designed for operations in either arctic or tropic waters.

In the processing section of the Sagitta Maris, fish are sorted, headed, filleted, washed, and then passed to a battery of vertical plate freezers which have a daily output of 30 metric tons of frozen fillets. The frozen blocks are then stored in the two fish rooms and kept at temperatures as low as -30° C. (-22° F.). Total capacity of the two holds is about 620 tons of frozen fillets. One of the holds is capable of being used as a fresh fish or frozen fish hold and has a capacity of either 165 tons of fresh or 200 tons of frozen fish.

On the factory deck there are three processing lines which include filleting and heading machines for large and small cod and ocean perch. The movement of fish through the processing section is entirely mechanized.

The vessel also has fish oil tanks with a capacity of 80 cubic meters (104.6 cubic yards) and fish meal holds with a capacity of 330 cubic meters (431.6 cubic yards) with reserve space for an additional 30 tons. A full supply of electronic equipment is carried including gyro compass and autopilot, Loran, direction-finder, Echograph, speed and warp speed indicators, two 60-mile-range radars, two fishfinders, one horizontal finder, and radio equipment.

The second vessel, which sailed on her maiden voyage early in October 1965, is the 1,800-ton stern-trawler Hamburg. Main dimensions of the Hamburg are length overall 82.1 meters (269.4 feet), moulded breadth 13.6 meters (41.4 feet), depth 8.3 meters (25.3 feet), and draft 4.3 meters (13.1 feet).

German Federal Republic (Contd.):

Main power unit is a diesel engine of 3,000 horse power at 350 r.p.m. which drives a single propeller to give a speed of about 15.25 knots. Accommodation is for a maximum of 60. The refrigerated fish rooms have a total capacity of about 870 cubic meters (1,137.9 cubic yards) maintained at a temperature of -28°C . (-18.4°F .).

The vessel has an operating range of about 60 days and is fitted with high-powered long-range radio communications apparatus. Her bridge equipment includes gyrocompass with automatic pilot, electric log, echo-sounder, two fish-finders, and two 60-mile radars. (The Fishing News, London, October 22, 1965.)



East Germany

DEEP-SEA SUBMARINE OPERATED BY REMOTE CONTROL DEVELOPED:

A submarine for deep-sea fishing has been developed by a ship-designing firm in Stralsund, East Germany. It works by remote control from a parent ship. It can be manned if required and is equipped with hydraulic spars to spread or contract a net in front of it. It is maneuverable and can switch depths quickly.

The fish catch is taken into the net as the submarine moves forward and passes through the net into a container in the craft. Greater catches can be achieved because greater depths can be fished than by conventional methods. An added advantage, according to the designers, is that little noise and wave movement to scare the fish are evident when the submarine is working. (Fishing News, October 8, 1965.)



Greece

FREEZER-TRAWLER FISHERY TRENDS, JANUARY-JULY 1965:

Landings: The Greek fleet of Atlantic freezer trawlers landed 14,437 metric tons of frozen fish during January-July 1965 as compared with 11,985 tons in the same period of 1964.

Fleet Expansion: VESSELS ORDERED FROM SOVIETS: A Greek shipowner has ordered 5 factory trawlers from Soviet shipyards at an estimated cost of US\$2.25 million for each vessel. It is understood that the order, arranged through Sudoimport, Moscow, calls for vessels of the "Maiakovskii class" with the following main specifications: length overall 84.7 meters (278 feet), breadth 14 meters (46 feet), depth 5.7 meters (19 feet), main engine 2,000 horsepower, and speed (loaded) 14 knots. Each vessel is to have storage capacity for 750 tons of frozen fish, 60 tons of canned fish, 150 tons of fish meal, and 50 tons of fish oil. The vessels are to be equipped with processing machinery for filleting, canning, and reduction. Freezing equipment on each vessel will include a blast-freezing tunnel with a daily capacity of 15 tons, and 6 horizontal plate freezers with a total daily capacity of 20 tons. The vessels are to be air-conditioned and designed to fish in tropic as well as Arctic areas. Electronic equipment will include radar, echo-sounders, and other fish-finding gear. The vessels should be able to remain at sea for 120 days. Delivery of 2 of the factory trawlers is scheduled for the first half of 1966, with the other 3 to be delivered by the fall of 1967.

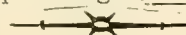
Meanwhile, another Greek factory trawler, the Rea (formerly the Soviet Krylov) has already begun operations in the Northwest Atlantic off Newfoundland. A Greek firm acquired that vessel from the Soviets and dispatched it to the Atlantic grounds in the summer of 1965 with a mixed Soviet and Greek crew. In late summer 1965, the vessel was reported catching about 10 tons of ocean perch a day, and it was expected to return to Greece in early October 1965 with 600 tons of frozen fish and 100 tons of fish meal.

VESSELS ACQUIRED FROM ICELAND: A Greek operator has acquired three Icelandic steam trawlers. One of those was being rebuilt to serve as a refrigerated transport. It is believed the other two will be used as Atlantic trawlers after being outfitted with freezing equipment. (Alieia, August 1965.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 55.

SHRIMP FISHING IN PERSIAN GULF:

The Greek freezer-trawler Evangelistria I was scheduled to sail in late August 1965 with four shrimp trawlers for the Persian Gulf to begin shrimp fishing. (Alieia, August 1965.)



Greenland

SALMON FISHERY TRENDS, OCTOBER 1965:

Inshore: The 1965 Greenland salmon catch in inshore waters should be considerably below the 1,400 metric tons taken in 1964. It was estimated that the Greenland inshore salmon catch did not exceed 770 tons in January-October 1965. During that period in 1964, about 68 percent of the total catch for the year was taken. The decline was due, at least in part to lower prices on the European market for Atlantic salmon on the one hand, and an improvement in the Greenland cod fishery on the other. For example, the average price received by Danish fishermen for salmon in August 1965 was 85 U. S. cents a pound as compared with \$1.32 in August 1964. Greenland salmon face a handicap in some markets because they are a deeper shade of red when smoked than Baltic salmon. However, the Greenland salmon are fatter, and it appears that about 65 percent of Greenland salmon approach the average weight of Baltic salmon which is about 3.5 to 4.5 kilos (7.7-9.9 pounds).

Salmon fishing in the inshore waters of Greenland is practiced in the coastal areas inside the banks along a stretch of coastline running from about latitude 60° N. to 69° N. As the crow flies, the length of that stretch of coastline is about 600 nautical miles, but in actual fact it is much longer because of its many bends, inlets, and fiords. The settled areas are few and far between, and their total number of inhabitants amounts to about 23,000, of which an estimated 11 percent might be classified as salmon fishermen. Others may make occasional catches.

The only fishing vessels available to most of those Greenland fishermen are rowing boats or small open motorboats. The sole equipment used has consisted of set nets reported to have a stretched mesh size of 10-16 centimeters (3.9-6.3 inches) from knot to knot.

Offshore: A Faroese vessel and a Norwegian vessel fished offshore from Greenland with gill nets in 1965. The catch of the Faroese vessel was reported to be 20 tons by November 1965, at which time the vessel was still fishing. The Norwegian vessel returned home with a catch of 12 tons. (Regional Fisheries Attache, United States Embassy,

Copenhagen, October 20, November 4 and 24, 1965; and other sources.)

Note: See Commercial Fisheries Review, November 1965 p. 58.



Honduras

SHRIMP LANDINGS DOWN IN 1965:

Catches of white shrimp during the late summer run were reported down sharply in the Honduran shrimp fishery. According to shrimp packers there, total shrimp landings for 1965 may be only half the quantity landed in 1964.



As of the end of September 1965, there were 30 shrimp vessels operating in Honduran waters--15 of them United States vessels and the remainder Honduran. At the same time a year earlier, 50 shrimp vessels were operating in the same waters. (United States Embassy, Tegucigalpa, November 6, 1965.)



Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, SEPTEMBER 30, 1965:

As of September 30, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 4,129 metric tons, an increase of 321 tons from the stocks on hand August 31, 1965. (United States Embassy, Reykjavik, October 26, 1965.)

United States imports of frozen groundfish fillets from Iceland in the year 1964 totaled 17,812 metric tons of groundfish blocks and

Iceland (Contd.):

Icelandic Export Stocks ^{1/} of Principal Fishery Products, September 30, 1965			
Item	Qty.	Value	
	Metric Tons	Million Kr.	US\$ 1,000
<u>Groundfish, frozen:</u>			
For export to:			
U. S.	4,129	90.8	2,108.7
Other countries	5,478	94.8	2,201.6
Stockfish	2,500	70.0	1,625.6
Herring, frozen	1,122	6.4	148.6
<u>Industrial products:</u>			
Fish meal:			
Herring	22,658	163.1	3,787.7
Other fish	1,811	12.2	283.3
Herring oil	33,566	278.6	6,470.0
^{1/} Includes only stocks intended for export.			
Note: Icelandic kronur 43.06 equal US\$1.00.			

slabs, 4,669 metric tons of cod fillets, 2,791 metric tons of haddock fillets, and 548 metric tons of ocean perch fillets.



Ireland

FISH MEAL INDUSTRY
EXPANSION TRENDS:

An Irish company is examining the possibilities of setting up a fish meal factory on the west or northwest coast of Ireland. As existing Irish fish meal factories sometimes have difficulty in obtaining supplies, the company is also considering the purchase of a number of trawlers.

For preliminary test fishing, the Irish firm chartered a Polish "B-25-type" trawler in the fall of 1965 to make a survey of Irish waters and the Atlantic shelf. The Polish vessel was chosen because of its low price, and also because of its apparent suitability for the waters to be investigated. The "B-25," in standard form, has a 15-day range, a cargo capacity of 43 tons, is 81 feet long, and has a beam of 21½ feet.

All the fish caught during the survey were to go to existing Irish fish meal factories.

Meanwhile, a new Irish fish meal plant opened in Millstreet in southern Ireland. That plant is expected to draw supplies from southwest and southern ports. (The Irish Skipper, No. 21, October 1965.)



Ivory Coast

FISHERY TRENDS, JANUARY-JUNE 1965:

Plans of the Ivory Coast Government for development of Abidjan's fishery facilities suffered a temporary setback in the first half of 1965 when invitations for bids for construction of a new 3,000-ton cold-storage facility were withdrawn. However, it was reported that the invitations were to be reissued with an additional proposal for a 50-ton per day tuna cannery. The cannery had previously been planned for a later date. Meanwhile, funds (about US\$2 million) for construction of a second Abidjan fish dock of 430 meters (1,410 feet) were committed. Construction of the new dock, which will double current berthing space, should begin early in 1966.

Landings by the Abidjan-based fleet of about 35 trawlers and 35 purse seiners totaled 21,984 metric tons for the first 6 months of 1965, an increase of 27 percent over the same period in 1964. Of that total, 44.3 tons were shrimp, an increase of 50 percent over the same period in 1964. Although shrimp landings are still small, they are a sign of the growing Ivory Coast shrimp production and the possibility of later exports to the U.S. market. Tuna landings of 6,208 tons in January-June 1965 (mostly for transshipment) were up 11 percent from those in the same period of 1964. Since the second 6 months of the year are traditionally more productive in Ivory Coast fisheries, it can be expected that the total for the year will be substantially greater than for 1964.

An event looked forward to with anticipation by Ivory Coast fishing interests, both Government and private, was the expected arrival in December 1965 of the fisheries research and training vessel President John F. Kennedy, which was financed by the U. S. Agency for International Development. (Fisheries Attache, United States Embassy, Abidjan, October 13, 1965.)



Japan

FROZEN TUNA EXPORTS TO U. S. AND
PUERTO RICO, JULY-SEPTEMBER 1965:

Japan's exports of frozen tuna to the United States and Puerto Rico in September 1965 dropped 39 percent in quantity and 32 percent in value from those in the previous month.

Japan (Contd.):

Exports to the United States were 19 percent lower than in August. Shipments to the United States were lower for all species of tuna, with the biggest drop in yellowfin exports which were down 32 percent from the quantity shipped in August.

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, July-September 1965						
Species	September		August		July	
	Quantity	Value	Quantity	Value	Quantity	Value
	Short Tons	US \$1,000	Short Tons	US \$1,000	Short Tons	US \$1,000
Albacore:						
United States...	2,387	798	2,603	824	4,910	1,424
Puerto Rico...	1,688	501	2,878	825	5,183	1,492
Total...	4,075	1,299	5,481	1,649	10,093	2,916
Yellowfin:						
United States...	1,460	462	2,159	694	2,361	803
Puerto Rico...	712	400	2,745	843	2,258	637
Total...	2,172	862	4,904	1,537	4,619	1,440
Big-eyed:						
United States...	2	1	5	1	-	-
Puerto Rico...	100	19	35	7	252	34
Total...	102	20	40	8	252	34
Total United States	3,849	1,261	4,767	1,519	7,271	2,227
Total Puerto Rico	2,500	920	5,658	1,675	7,693	2,163
Grand total...	6,349	2,181	10,425	3,194	14,964	4,390

Source: Japan's Bureau of Customs.

The September exports to Puerto Rico were down 56 percent from the previous month. Exports of yellowfin tuna were down sharply--74 percent less than the previous month. Shipments of big-eyed tuna to Puerto Rico in September were about three times the quantity shipped in August. (Fisheries Attache, United States Embassy, November 11, 1965.)

EXPORT VALIDATIONS OF FRESH AND FROZEN TUNA AND TUNA LOINS, APRIL-SEPTEMBER 1965:

Japan's export validations of frozen tuna and cooked frozen tuna loins to the United States and Canada in September 1965 were down 30 percent from the same month in 1964. Albacore and yellowfin tuna accounted for 89 percent of that month's export approvals to those countries. Included in the September 1965 shipments were 2,286 short tons from Japanese transshipment bases including American Samoa.

For the 6 months April-September 1965, Japan's frozen tuna export validations for the United States and Canada (included 5,799 tons from Japanese transshipment bases) were about 2 percent less than in the same 6 months

Japan's Export Validations of Fresh and Frozen Tuna and Tuna Loins by Country of Destination, April-September 1965						
Item	To U.S. & Canada		To Other Countries		Total	
	Sept.	Apr.-Sept.	Sept.	Apr.-Sept.	Sept.	Apr.-Sept.
	. (Short Tons)		. . . . . (Metric Tons)		
Albacore, round	5,385	37,602	1,375	5,130	6,260	39,243
Yellowfin:						
Round	1,004	3,821	60	96	385	1,757
Gilled & gutted; 20/100 lbs.	2,472	17,077	785	2,392	3,028	17,884
100 lbs. up	75	1,708	-	-	68	1,550
Drstd. with tail	408	4,083	1,586	14,326	1,956	18,031
Filletts	-	3	-	5	-	6
Total	3,959	26,692	2,431	16,819	5,437	39,228
Big-eyed:						
Dressed	381	821	811	5,411	885	5,650
Other	4	48	46	424	49	468
Total	385	869	857	5,835	934	6,118
Skipjack	414	4,475	-	517	375	4,675
Bluefin:						
Dressed	-	-	117	2,586	117	2,586
Filletts	-	-	75	947	75	947
Total	-	-	192	3,533	192	3,533
Loins:						
Albacore	341	1,543	-	9	310	1,409
Yellowfin	30	1,055	5	24	32	981
Total	371	2,598	5	33	342	2,390
Grand total 1965	10,514	72,236	4,860	31,867	13,540	95,087
Grand total 1964	15,089	74,039	3,858	27,858	17,547	95,026

of 1964. (Fisheries Attache, United States Embassy, Tokyo, November 11, 1965.)

FROZEN ALBACORE TUNA PRICE FOR EXPORT TO U. S. FROM JAPAN PROPER:

The export price of round frozen albacore tuna for shipment to the United States from Japan proper reached in late October 1965 US\$385-390 a short ton c.i.f., and that of frozen tuna loins \$780-800 a short ton. Trade in loins was reported brisk.

Also, towards the end of October the ex-vessel price of albacore at Tokyo climbed to 133-135 yen a kilogram (\$335-340 a short ton) and at Yaizu reached a high of 140 yen a kilogram (\$353 a short ton). It was reported that at those prices Japanese traders would not be able to procure supplies for export to the United States in a large quantity unless export prices climbed up to \$400 a ton c.i.f. (Suisan Tsushin, October 29, 1965.)

ATLANTIC TUNA MARKET AND FISHING TRENDS:

The export market of Atlantic-caught tuna firmed up during August-October 1965. Albacore tuna (frozen round), which at one time sold for US\$270 a short ton f.o.b. Las Palmas,

Japan (Contd.):

as of October 1965 was being exported extensively to Spain for the equivalent of \$340 a short ton f.o.b. Las Palmas. Similarly, the price of dressed big-eyed tuna exported to Italy rose considerably, and Italian tuna buyers in October were willing to pay as much as \$340 a metric ton c.i.f. Italy, or about \$70 a ton more than a few months prior to October. Dressed yellowfin tuna exported to Italy brought the top price of \$450 a metric ton c.i.f. Italy.

The ex-vessel price of dressed big-eyed tuna landed in Japan proper was so high (about 150 yen a kilogram or \$378 a short ton) in October that it would pay for those engaged in the Atlantic tuna fishery to transship their big-eyed catches to Japan. This development in turn served to push up the export price of Atlantic big-eyed. Reportedly, the export price of \$350 a metric ton c.i.f. Italy worked out to about ex-vessel 100 yen a kilogram (\$252 a short ton). The cost of transshipping Atlantic-caught tuna to Japan (including other miscellaneous costs) amounted to about 25 yen a kilogram (\$63 a short ton). On the basis of those figures, the price of Atlantic big-eyed transshipped and landed in Japan amounted to about 125 yen a kilogram (\$315 a short ton), or about \$63 a short ton below the reported prevailing price in Japan of about \$378 a short ton.

A large United States west coast tuna packer had offered to buy 1,500 short tons of Japanese-caught Atlantic albacore tuna for delivery in January 1966. The firm offered to pay the prevailing price in January but attached the condition that Japan pay \$10 a ton of the transportation cost.

This offer is the first of its kind received by Japan since Japan decided to adopt a policy of seeking to redistribute the supply of Atlantic albacore to markets other than Puerto Rico so as to avoid supply gluts (such as that which occurred in 1964 at Puerto Rico) and to assess industry members a fee to defray part of the increase in transportation costs. Frozen tuna prices firmed up and supplies were short. With fewer vessels operating in the Atlantic and Spanish market demand increasing, there does not seem to be any foreseeable marketing problem. The Japanese trading firms felt strongly that they should not, at that time, accept the offer.

Japanese albacore fishing in the Atlantic Ocean continued good during October in the vicinity of 30° N. latitude and 20°-30° W. longitudes, with daily catches ranging between 3.5-5 metric tons a vessel. Over one-half of the landings made in October were sold to Spain at frozen round c.i.f. prices of US\$420-430 a metric ton (said to equal \$330-335 a short ton f.o.b. Las Palmas). As per the last week in October, over 5,000 metric tons of albacore were estimated to have been contracted for sale to Spain.

While it was not known how much longer albacore tuna exports to Spain would continue in 1965, Japanese tuna suppliers were of the opinion that further purchase offers from that country for fairly large quantities could be expected since Spain's tuna requirements definitely have not been met; hence, they expected the albacore export market to continue firm for some time. (Suisan Tsushin, October 22, 25, 27, & 28, 1965.)

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CANNED TUNA IN BRINE SALES TO U.S.:

The Japan Canned Tuna Sales Company announced October 22, 1965, that a total of 280,000 cases of canned tuna in brine (230,000 cases of whitemeat tuna and 50,000 cases of lightmeat) for export to the United States was to be offered for the October sale. The promotional allowance for the whitemeat pack (US\$0.50 a case) was to be the same as in the previous sales, but the premium on the lightmeat 7-oz. and 13-oz. packs was raised by 100 yen (\$0.277) to 200 yen (\$0.55) a case. Closing date for the sale was announced as October 28. (Katsuo-Maguro Tsushin, October 25, 1965.)

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INDUSTRY OFFICIAL'S VIEW ON U. S. TUNA TOUR:

The Japan Canned Foods Exporters Association's Vice President returned to Japan October 13, 1965, after attending the New York City Japanese tuna conference (September 30-October 1). He was one of the 14 Government-industry representatives who participated in the New York tuna conference sponsored by the Japanese Ministry of International Trade and Industry. His comments on the recent U. S. tour were as follows:

The New York conference was held in the form of a briefing session, with local Japanese

Japan (Contd.):

trade representatives explaining developments to the group (consisting of representatives from the Japanese Government, canned food exporters, food packers, frozen food producers, and can manufacturers). The conference was significant and left a strong impression with the attendants that similar meetings should be held again in the future.

Members of the party met and spoke with local American importers, who requested that Japan supply canned tuna, particularly lightmeat tuna, on a continuous basis. They cited instances of heavy shipments during the slow year-end season and occurrences of supply shortages during the important Lenten season, and strongly urged that such things do not happen again. They also pointed out the quality deterioration of Japanese products. The resident Japanese trade representatives expressed the desire that particular attention be given to the quality of institutional tuna packs. American importers and resident Japanese traders agreed that excess competition among Japanese trading firms has disappeared and that the big problem now was competition with the products packed by major U. S. packers.

The group visited Puerto Rico. We were all impressed by the equipment and efficient operations of the local tuna canneries, fish unloading facilities, cold storages, and receiving and shipping plants. We felt we have much to learn from their rationalization efforts. Two canneries were busily packing tuna in brine.

Owing to shortage of Japanese canned lightmeat tuna, 2 or 3 Japanese trading firms were reported buying U. S. products to fill the gap.

The present canned tuna sales system should be continued and sales should be expanded within the framework of that system. In the last three months or so, measures have been adopted whereby trading firms have been able to sell any quantity they ordered as long as supplies were available and, at the same time, avoid excessive competition. Should excessive competition occur, it may be necessary to strictly enforce the administration of the Exporters Agreement but, at the present time, we wish to see the adoption of flexible measures which will help expand sales. In this context, we would like to see the Agreement extended through March 1966. (Note: Present Agreement expired November 1965.)

Brands are an important factor in the sale of small-size canned tuna on the U. S. market. In the case of Japanese products, advertised brands handled by 3 or 4 trading firms are gaining more shelf space, although they still do not have the power to produce volume sales. Therefore, to increase sales, their production costs would have to be reduced to the level where they can be sold at the price of private labels.

The production ratio between canned white-meat tuna and canned lightmeat tuna should not be drastically changed. Canned whitemeat tuna will not sell well in a predominantly lightmeat tuna market. We should not allow the U. S. market for Japanese canned lightmeat tuna, which Japan has built up so far, to vanish. (Suisan Tsushin, October 15, 1965.)

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TUNA PURSE-SEINING TO BE TRIED NEAR GUAM:

A joint experimental tuna purse-seine operation in the central west Pacific by the two Japanese purse seiners Kenyo Maru (240 gross tons) and Taikei Maru No. 23 (212 gross tons) was planned by their owners. The two vessels expected to fish off Guam Island from late 1965 until the end of February 1966 to determine the feasibility of establishing a year-round purse-seine fishery in the central west Pacific. Both the Kenyo Maru and the Taikei Maru were equipped with power blocks. (Shin Suisan Shimbun Sokuho, October 19, 1965.)

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GOVERNMENT TAKES DIM VIEW OF INDUSTRY'S TUNA FISHERY RATIONALIZATION PROPOSALS:

The Japanese Fisheries Agency is studying the establishment of a semigovernment corporation proposed by the National Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN) to help the depressed tuna fishery. But the Government is reluctant to approve that plan in its present form. Under NIKKATSUREN's plan, the corporation would systematically carry out fleet reduction by liquidating fishery enterprises considered hopeless of financial recovery and assist tuna vessel owners in modernizing their vessels and in rationalizing their management. An estimated nine billion yen (US\$25 million) needed to operate this corporation would be financed entirely by the Government. Reportedly, the Agency's

Japan (Contd.):

basic attitude towards NIKKATSUREN's plan is as follows:

(1) The Government cannot consider bearing the full financial burden of the corporation. (2) Extension of interest-free loans for modernizing fishing vessels and rationalizing fishery management will create problems, although financial assistance should be provided within the existing framework of the law. (3) Payment of separation allowances to vessel crews affected by the vessel reduction plan will present problems. (4) Rehabilitation loans should not be granted to vessel owners other than those afflicted by sea disaster. (Minato Shimbun, October 23, 1965.)

CRAB MEAT EXPORTS, SEPTEMBER 1965:

Japanese exports of canned crab meat in September 1965 amounted to 66,308 cases (48 $\frac{1}{2}$ -lb. cans) as compared with 77,702 cases during the previous month and 70,534 cases in September 1964. Of the total canned crab meat exports in September 1965, 14,645 cases were shipped to the United States, 13,700 cases to the United Kingdom, 3,215 cases to Canada, and 34,748 cases to other countries.

In September 1965, king crab meat exports amounted to 43,727 cases or 66 percent of total canned crab meat exported. Of the total king crab exported in September 1965, 11,472 cases went to the United States, 11,025 cases to the United Kingdom, and 21,230 cases to other countries.

The September 1965 Japanese canned crab meat exports also included: Kegani crab--9,516 cases of which 2,423 cases went to the United States; Zuwai crab--13,015 cases of which 750 cases went to the United States; and 50 cases of Hanasaki crab. (Fisheries Attache, United States Embassy, Tokyo, October 22, 1965.)

CANNED SHRIMP EXPORTS, SEPTEMBER 1965:

Japan's exports of canned shrimp (24 $\frac{1}{2}$ -lb. cans) during September 1965 were very light, falling far below those in August 1965 and September 1964. Limited shrimp fishing in the Bering Sea was said to be the reason

Japan's Exports of Canned Shrimp by Country of Destination, August and September 1965 with Comparisons				
Country of Destination	1965		1964	
	Sept.	Aug.	Sept.	Aug.
	... (Cases of 24 $\frac{1}{2}$ -Lb. Cans) ...			
United States	3,000	5,600	16,275	20,146
United Kingdom . .	3,000	19,870	37,100	16,790
Canada	5,900	5,600	6,836	6,002
Other	2,900	8,315	5,358	1,604
Total	14,800	39,385	65,569	44,542

for the decline. (Fisheries Attache, United States Embassy, Tokyo, October 22, 1965.)

EXPORT PRICES OF CANNED SARDINE AND MACKEREL RAISED:

The Japan Canned Sardine and Saury Packers Association, at the October 21, 1965, directors' meeting, voted to raise the export prices for canned mackerel and sardine. The

Japanese Canned Sardine and Mackerel Export Prices, f.o.b. Japan (Previous prices shown in parentheses)				
Japanese Can and Case Size	Equivalent U.S. Can Size	Price Per Case		Country of Destination
		Yen	US\$	
<u>Sardines in tomato sauce:</u>				
No. 1 oval (24 cans)	1-lb. oval (24's)	1,450 (1,325)	4.03 (3.68)	United States
No. 3 oval (48 cans)	1/2-lb. oval (48's)	1,575 (1,525)	4.38 (4.24)	" "
No. 1 oval (24 cans)	1-lb. oval (24's)	1,400 (1,275)	3.89 (3.54)	Other Countries
No. 3 oval (48 cans)	1/2-lb. oval (48's)	1,525 (1,475)	4.24 (4.10)	" "
No. 1 small (100 cans)	5-oz. tall (100's)	2,350 (2,200)	6.53 (6.11)	" "
No. 4 (48 cans)	1-lb. tall (48's)	2,500 (2,200)	6.94 (6.11)	" "
<u>Mackerel in tomato sauce:</u>				
No. 1 oval (24 cans)	1-lb. oval (24's)	1,175 (1,125)	3.26 (3.13)	Other Countries
No. 3 oval (48 cans)	1/2-lb. oval (48's)	1,350 (1,250)	3.75 (3.47)	" "

new prices for canned sardine went into effect immediately, while those for canned mackerel became effective November 1. (Suisan Tsu-chin, October 23, 1965.)

FROZEN SWORDFISH EXPORT VALIDATIONS TO THE U. S. AND CANADA, APRIL-SEPTEMBER 1965:

Japanese export validations of frozen broadbill swordfish (mostly fillets and chunks) to the United States and Canada in September 1965 totaled 591 short tons valued at US\$479,857. This compared with approvals of 569 tons valued at \$438,551 in the previous month and 569 tons valued at \$343,569 in September 1964.

Japan (Contd.):

For the 6 months April-September 1965, Japan's export validations of frozen swordfish to the same countries totaled 2,285 tons valued at \$1.7 million. Fillets of that species accounted for 66 percent of the total, with the remainder consisting of chunks and swordfish processed in other forms. For the same 6 months in 1964, the frozen swordfish export approvals totaled 1,723 tons valued at \$984,655. (Fisheries Attache, United States Embassy, Tokyo, November 2, 1965.)

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EXPORTS OF FROZEN RAINBOW TROUT, SEPTEMBER 1965:

Japan's exports of frozen rainbow trout in September 1965 were up 23 percent in quantity and 20 percent in value from the previous month's exports. As in August, the United States was the principal buyer of Japanese

Japan's Exports of Frozen Rainbow Trout by Country of Destination, September 1965 with Comparisons						
Destination by Country	September		August		July	
	Qty.	Value	Qty.	Value	Qty.	Value
	Short Tons	US\$	Short Tons	US\$	Short Tons	US\$
United States . .	131	97,869	108	82,042	112	79,731
United Kingdom	41	25,500	32	21,155	29	18,994
Belgium	11	7,903	14	11,547	27	22,575
Canada	26	19,447	11	7,792	29	20,589
Australia	2	1,689	5	4,142	1	1,114
Other	18	13,411	16	11,233	2	1,712
Total	229	165,819	186	137,911	200	144,715

Source: Japan's Bureau of Customs.

frozen rainbow trout, accounting for 57 percent in quantity and 59 percent in value of the total September 1965 exports. (Fisheries Attache, United States Embassy, Tokyo, October 20 and November 9, 1965.)

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EXPORTS OF FROZEN FISHERY PRODUCTS OTHER THAN TUNA, APRIL-SEPTEMBER 1965:

Japanese exports of frozen fishery products (excluding tuna) in April-September 1965 amounted to 12,391 short tons valued at US\$4.1 million. Of that total, 1,431 tons valued at a little more than \$1.2 million were exported to the United States. Principal items shipped to the United States were frozen rainbow trout (356 tons, value \$274,000), swordfish steaks (277 tons, value \$245,000), shrimp (155 tons, value \$243,000), and frog legs (140 tons, value \$199,000).

Exports to countries in West Africa during the period totaled 4,082 tons valued at \$497,000, made up completely of overseas trawl fish. Shipments to other principal countries included South Africa with 1,596 tons valued at \$250,000 (overseas trawl fish); Australia, 949 tons valued at \$468,000 (mostly overseas trawl fish, some cod, shrimp, and oysters); and United Kingdom, 563 tons valued at \$558,000 (shrimp, rainbow trout, some salmon, overseas trawl fish). (Fisheries Attache, United States Embassy, Tokyo, November 2, 1965.)

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POOR 1965 SAURY SEASON FORECAST:

The 1965 saury fishery in Japan continued extremely poor as of the latter part of October 1965. It is forecast that the season's total catch may fall far below the poor season of 1964, when landings totaled about 200,000 metric tons. In 1963 the saury catch totaled 384,000 tons; in 1962, 483,000 tons. Light landings in early October at one point forced ex-vessel prices up to a high of 180 yen a kilogram (US\$0.227 a pound). Fishing improved for a few days in mid-October, with about 6,000 tons landed, and prices dropped to 20-40 yen a kilogram (\$0.025-0.05 a pound). (Suisan Keizai Shimbum, October 22; Suisan Tsushin, October 21, 1965.)

(Note: About 500 Japanese fishing vessels were reported fishing for saury in 1965. The Soviet Union is also engaged in this fishery, having entered it about seven years ago. The Soviet fleet (exact size not known but Japanese sources indicate fleet to be large) starts fishing for saury off the Kurile Islands about a month before the season opens in Japan, following the schools southward. In 1964 and again in 1965, Soviet fishing vessels were sighted operating as far south as the waters off Kinkazan (38° 15' N. latitude), northeastern Japan.

In addition to the Soviet Union, the Republic of Korea (ROK) has entered the saury fishery. The Korean fleet in 1965 consisted of two 80-ton fishing vessels and a 180-ton carrier vessel. The vessels operated out of Onahama, Fukushima Prefecture. The two fishing vessels reportedly were constructed at Onahama and exported to South Korea.

The entry into the saury fishery by the Soviet Union and South Korea (but especially the Soviet Union with her large, efficient fishing

Japan (Contd.):

vessels), the appearance of the Soviet fleet farther south each year near grounds traditionally fished by Japanese fishermen, the possibility that both the Soviet Union and South Korea may increase their fleets in the future, the failure of the Japanese saury fishery in 1964, and prospects of a worse season in 1965 do not present a very bright picture for Japanese saury fishermen.

The poor saury season is also expected to work difficulties on the Japanese tuna fishermen. Saury are used extensively as bait by the tuna long-line fishermen (the annual demand of which is estimated at 40,000-60,000 metric tons by one periodical), who will, as in 1964/65, be compelled to pay high prices for saury bait. Due to the shortage and high price of bait saury, some long-line fishermen early in 1965 experimented with small mackerel, which proved quite satisfactory.)

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BERING SEA FISHING TRENDS:

The 11,500-ton Japanese factoryship Tenyo Maru ended operations in the Bering Sea on October 3, 1965, and returned to Yokohama October 15. The factoryship produced 5,574 metric tons of minced fish meat and 4,781 tons of fish meal. The minced meat was contracted for sale at over 100,000 yen (US\$278) a metric ton and the fish meal 73,000 yen (\$203) a ton. (Suisan Tsushin, October 7 & 15, 1965.)

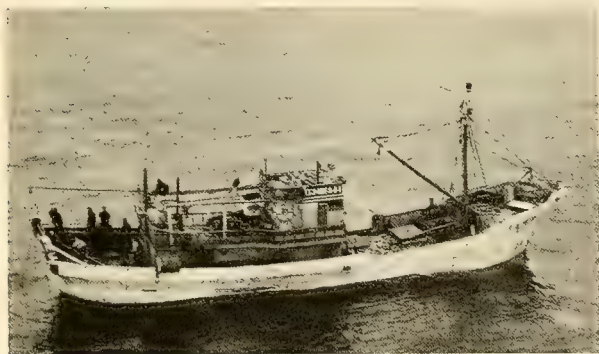


Fig. 1 - Japanese trawler fishing in the Bering Sea for the factoryship Tenyo Maru.

Another Japanese firm is reported planning to install on its fish meal factoryship Gyokuei Maru (10,357 gross tons) equipment to process about 30 metric tons of minced

fish meat a day. That firm is also planning on sending the factoryship to the Bering Sea earlier in the season, about March of 1966. (Shin Suisan Shimbun Sokuho, October 9, 1965.)



Fig. 2 - Nets used by a Japanese trawler in the Bering Sea.

The factoryship Chichibu Maru (7,472 gross tons) ended fishing operations in the Bering Sea on October 15. The factoryship was scheduled to arrive in Hakodate October 22-23 with about 4,500 metric tons of processed fish, mainly Pacific ocean perch. (Suisan Tsushin, October 19, 1965.)

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VIEWS ON NORTH PACIFIC WHALE STOCKS:

In preparation for the 4-nation North Pacific whale conference (Japan, U.S.S.R., Canada, and the United States) scheduled to convene in Honolulu in early 1966, Japan is consolidating its views on the state of the North Pacific whale resources. Opinion reportedly is that the condition of the North Pacific whale stocks is such that prompt measures must be taken to protect the resources. On October 12, 1965, the Director of the Japan Whale Research Institute expressed the following views on the need to restrict whaling operations in 1966:

"It may be said that the problem of the North Pacific whale stocks concerns only Japan and the Soviet Union. We are now studying Soviet catch data which the Russians finally forwarded to Japan in June this year. According to their data, considerable quantities of humpback and fin whales have been taken

Japan (Contd.):



Fig. 1 - Japanese whale catcher boat in North Pacific.

by the Soviet Union. With regard to hump-back whales, the Scientific Committee on North Pacific Whales has recommended that the capture of that species be prohibited for one year in 1966 and that subsequent recommendations be made after assessing the results of that measure. The fin whale stock has declined considerably, so I believe further catch reduction is necessary. That leaves us with the sei whales, but that stock also shows a declining trend. The North Pacific whales should be considered as having declined in abundance commensurate to the increased catches made by the two additional Soviet whale fleets. Depletion of whale stocks

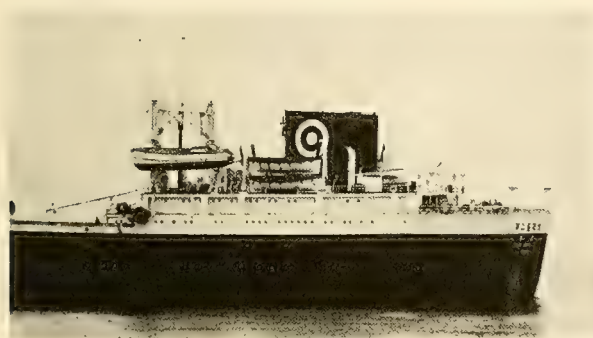


Fig. 2 - Japanese whale factoryship operating in North Pacific.

would also adversely affect the Soviet Union so it is most important that both Japan and the Soviet Union reach accord at the forthcoming scientific meeting. In working out arrangements, it is desirable that catch limits be set according to species. It will probably be difficult for Japan to continue harvesting whales in the quantity taken this year.

North Pacific whaling involves operations from land stations, which makes it more complex than the Antarctic operations." (Suisan-cho Nippo, October 13, 1965.)

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NORTH PACIFIC SPERM WHALE STUDY:

The Japan Whale Research Institute, in cooperation with a large Japanese fishing company, undertook a sperm whale study in fall 1965 to establish a scientific basis for supporting Japan's proposal to relax the size restriction (imposed by the International Whaling Commission) on harvestable sizes (over 35 feet) of sperm whales. It is reported that four whale catchers (belonging to the fishery firm), operating under contract to the Whale Institute, assembled off eastern Hokkaido and on September 29 located a herd of 25 sperm whales eight miles off Akkeshi. The catchers simultaneously closed in on the herd and killed 21 whales, one of which was not recoverable. The 20 whales were hauled to Akkeshi where they were examined as to length, sex, and sexual maturity. The 20 whales consisted of 16 females, 3 males, and 2 calves (one of which was lost at sea).

The whaling expedition to collect scientific data is reported to be the first of its kind undertaken by any nation. Another expedition is expected to be launched in or after 1966.

On November 10, 1965, the Japan Whale Research Institute and the fishing company presented a report on their findings to a group of 20 government and industry officials. The study revealed that (1) sperm whales are still abundant, (2) whale herds differ in size and sexual composition (although the species is polygamous in nature), (3) females below the present minimum harvestable size limit (35 feet in case of base-type whaling operations) are sexually capable of reproduction, and (4) natural mortality appears high.

It was reported that the findings lend support to Japan's claim in seeking a relaxation of international whaling regulations. However, it was decided at the meeting that conclusions should not be hastily drawn on the basis of the one study conducted to date and that further studies should be undertaken. (Suisan Keizai Shimbun, October 8 and November 10, 1965.)

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Japan (Contd.):

ANTARCTIC WHALING OPERATIONS AND OUTLOOK FOR 1965/66 SEASON:

The three Japanese whaling firms scheduled to participate in the Twentieth (1965/66) Antarctic Whaling Expedition were to operate a total of 5 whaling fleets, 2 less than on the Nineteenth (1964/65) Expedition. Owing to the reduction of the international catch quota to 4,500 blue-whale units for the 1965/66 Antarctic whaling season, as compared with 8,000 blue-whale units for 1964/65 informally agreed to by the four whaling countries (Japan, Soviet Union, Norway, the Netherlands), Japan's national quota (52 percent) for the 1965/66 season is 2,340 blue-whale units; in the 1964/65 season it was 4,160 blue-whale units. (*Suisan Keizai Shimbun*, October 18, 1965.)



Japanese whale catcher alongside factoryship to receive supplies and fuel.

To compensate for those cuts, Japan is striving to increase its catching and processing efficiency on the whaling grounds. This season, the Japanese fleets include a larger proportion of catcher vessels and freezer-ships. Japanese whaling companies plan to increase their yield per whale by processing whale meat to the fullest extent possible. The fleets will concentrate on catching sei whales for their high meat yield. The catch of sperm whales (used mainly for oil extraction) will be kept at a low level.

The five Japanese Antarctic whaling fleets departed in late October 1965 for the whaling grounds which were scheduled to open December 12, 1965. The production goals in 1965/66 for the Japanese Antarctic whaling fleet are 47,109 metric tons of baleen whale oil, 450 tons of sperm oil, 106,854 tons of

frozen whale meat, 3,827 tons of salted whale meat, 2,496 tons of fish meal, and 250 tons of whale extract.

The Japanese expect good prices for both whale oil and whale meat in 1966, and estimate that the value of a blue-whale unit taken in the 1965/66 Antarctic season will be 7.5 to 8 million yen (US\$20,800 to \$22,200) as compared to 6 million yen (\$16,700) in the previous season.

The motherships in the Japanese 1965/66 Antarctic fleet are the 16,810-ton *Nisshin Maru*, the 23,406-ton *Nisshin Maru No. 3*, the 19,319-ton *Tonan Maru*, the 13,815-ton *Tonan Maru No. 2*, and the 20,300-ton *Kyokuyo Maru No. 3*. The fleet also includes 13 freezer vessels (ranging from 3,846 to 11,193 gross tons), 20 carrier vessels (958 to 7,492 gross tons), 4 tankers (12,048 to 13,156 gross tons), 44 catcher vessels (375 to 758 gross tons), and 8 search or collection vessels (399 to 723 gross tons). (*Nihon Keizai*, October 19, 1965.)

Note: See *Commercial Fisheries Review*, October 1965 p. 91; August 1965 p. 85; and June 1965 p. 44.

POLLOCK TO BE IMPORTED FROM U. S. S. R.:

The Japanese Ministry of Agriculture and Forestry announced on October 7, 1965, that the Government had decided to permit the importation of 45,000 metric tons of Alaska pollock for processing into fish meal from the Soviet Union in 1966. The pollock will be delivered by Russian trawlers operating in the Okhotsk Sea to the 14,000-ton Japanese factoryship *Hoyo Maru*.

In January-March 1965, the Japanese firm that operates that factoryship had purchased about 36,000 tons of Alaska pollock from Soviet trawlers. Subsequently, the same firm as well as several others submitted applications to the Government to import in 1966 over 100,000 tons of pollock. This move was strongly opposed by the land-based fishermen and processors in Hokkaido. Settlement of the issue was on a political level. (*Suisan Keizai Shimbun*, October 12, 1965, and other sources.)

Note: See *Commercial Fisheries Review*, November 1965 p. 67; October 1965 p. 83.

Japan (Contd.):

JAPAN-COMMUNIST CHINA FISHERY AGREEMENT TO BE RENEGOTIATED:

The Japan-Communist China Private Fishery Agreement, a two-year pact concluded November 8, 1963, to regulate Japanese and Communist Chinese fishing activities off the mainland China coast, was scheduled to be renegotiated in Peiping, China, in late November 1965. On October 20, the Communist Chinese Fishery Association informed the Japan-Communist China Fishery Association of Japan that it considered the Agreement inadequate in protecting fishery resources and requested that negotiations be held in Peiping in late November. The Japanese Association met October 28 and selected a delegation of 10 members to represent Japan at that conference. (Suisancho Nippo, October 30; Min-ato Shimbun, October 21, 1965.)

GOVERNMENT TO COMPENSATE FISHERMEN FOR VESSELS SEIZED BY SOUTH KOREA:

The Japanese Fisheries Agency and the Finance Ministry, which have been conferring on measures to provide financial assistance to fishing vessel owners who suffered losses as a result of having their vessels seized by South Korean patrol boats, reached agreement on the amount of compensation and method of compensating vessel owners. The proposed funding measures were formally adopted at an October 22, 1965, Cabinet meeting.

(1) The Government will appropriate a sum of 4,000 million yen (US\$11 million) in the supplementary budget as a special aid fund.

(2) The Agriculture-Forestry-Fisheries Cooperative Bank will make available a total of 1,000 million yen (\$2.8 million) for long-term, low-interest loans to affected vessel owners.

(3) The Government will give special tax consideration in matters involving special financial assistance given to the fishermen.

(4) Sums already paid by the Government to vessel owners in the form of insurance payments will be deducted from the total com-

pensation fund. (Suisan Tsushin, October 23, 1965.)

REPORT ON OVERSEAS FISHERY INVESTMENTS:

The Japanese Fisheries Agency released in October 1965 a 77-page report on the status of Japanese investments in overseas fishery enterprises. The report reveals that Japanese fishery investments in foreign countries as of March 1962 amounted to 1.5 percent of total Japanese overseas capital investments in production enterprises. Mining investments led all overseas investments with 48 percent, followed by lumber with 14 percent. Capital investments in overseas fishery enterprises presently total in value about 20,000 million yen (US\$55.6 million) invested by 19 Japanese companies in 28 cooperative fishery enterprises in 22 foreign countries. Japan's capital investments in the 28 cooperative enterprises average in value over 70 million yen (US\$194,444) per enterprise (45 percent in capital goods) and investment share per enterprise about 61 percent.

Of the 28 cooperative fishery enterprises, 11 (40 percent) are located in South and Central America, 10 (35 percent) in Southeast Asia, 3 (10 percent) in Africa, and 4 (15 percent) in other areas. The 28 enterprises operate a total of 76 fishing vessels, consisting of 51 (67 percent) trawlers mostly in the 50- to 100-ton class; 17 (22 percent) tuna vessels in the 50- to 500-ton class; 6 whale catchers; and 2 other fishing vessels. A total of 42 vessels (including 30 trawlers and 9 tuna vessels) operate out of Central and South America; 26 vessels (20 trawlers and 6 tuna vessels) operate out of Southeast Asia; 3 vessels out of Africa; and 5 (all whalers) from other areas. Of the 76 vessels, 28 vessels (37 percent) were built by or imported from countries other than Japan, 16 vessels (21 percent) imported from Japan, 14 vessels (18 percent) financed by Japan, and 18 (24 percent) chartered from Japan.

Production in 1964 of those overseas enterprises (for which catch data are available) engaged in fishing operations totaled 27,396 metric tons, declining slightly from 1963's production of 28,460 tons. Production of trawl-caught fish, for the second successive year, declined slightly, totaling 13,630 tons as compared to 1963 landings of 14,275 tons. Tuna

Japan (Contd.):

production, which totaled 1,248 tons in 1960, reached a peak of 9,151 tons in 1963 but declined drastically (34 percent) in 1964 to 6,053 tons. Shrimp production, which totaled 347 tons in 1961, jumped from 5,034 tons in 1963 to 7,714 tons in 1964, up 53 percent. The harvest of whales in 1964 totaled 1,184 whales as compared to 850 whales in 1963.

With respect to the financial condition of the overseas enterprises, the Agency's report shows that returns from investments are still very small. Financial reports submitted to the Agency by 23 enterprises showed that in 1964 only 11 firms recorded a profit (after deducting depreciation), and among those 11 firms only three declared dividends and remitted an estimated 3 million yen (US\$8,333) to Japan. The financial status of five enterprises is unknown due to the fact that some of them are not yet in operation or have suspended operations. (Source: Present Status of Japanese Overseas Capital Investments in Cooperative Fishery Enterprises, Production Division, Japanese Fisheries Agency, October 1965.)

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SCIENTISTS SEE NEED TO RE-EXAMINE DISTANT-WATER FISHERIES POLICY:

It is reported that an increasing number of Japanese scientists are beginning to feel that the present Japanese Government fishery policy on distant-water fisheries cannot cope with changes occurring in those fisheries, which rapidly developed after the war and which subsequently have undergone tremendous structural changes. They are said to feel that the continued administration of measures based on the existing policy has arrested Japan's growth of the distant-water fisheries and there is a definite need to re-examine and clarify policies for those fisheries from a fresh and different point of view. These views cropped up at the meetings sponsored by the Japan Fishery Resource Conservation Association.

The views of the scientists are shared by some members of the Government. Industry is also moving in this general direction, as witnessed by the developments in Japan related to the promotion and stabilization of Japan's international fisheries. (Katsuo-Maguro Tsushin, October 29, 1965.)

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VESSEL MANAGEMENT AND OPERATION TRENDS, FY 1964:

The Statistics and Survey Division of the Japanese Ministry of Agriculture and Forestry released in October 1965 a preliminary report on fishery statistics for fiscal year 1964 (April 1964-March 1965) showing trends in management, vessel operations, and labor employment. According to that report, Japanese fishery enterprises numbered 297,087 management units, declining 8,284 units or 2.7 percent from fiscal year 1963. The decline occurred in enterprises operating without fishing vessels, enterprises operating unpowered vessels, those operating 1- to 3-ton and 5- to 30-ton powered vessels, and in the beach-seine fishery. Fishery enterprises which increased in number were those employing 3- to 5-ton, 100- to 200-ton, and over 500-ton powered vessels, as well as those engaged in shallow-seas culture fisheries (primarily seaweed culture). The survey showed that withdrawals from the fisheries are continuing as in earlier years at a high rate rarely observed in any other industry. In agriculture, another primary industry which is always used for comparison, withdrawals are also high but the number of farming families has not shown a declining trend. In the fisheries, the decline in management units was greatest in the unpowered vessel category, where the decrease totaled 8,415 units. However, this decline was due in large part to management units installing outboard motors on their vessels, as in the shallow-seas culture fisheries.

Essentially, the survey revealed the following trends in fishery management:

Decrease in management units: (1) Among the family-type managements, on the whole, those in the category employing vessels in the fishery showed a large decrease. A particularly large decrease occurred in the unpowered vessel category where the decline totaled 8,415 management units (14 percent). This was due, in addition to such factors as withdrawals and transfers, to vessel reclassification resulting from conversion to powered vessels. The reduction of 2,328 management units (5 percent) in the category of enterprises not operating vessels, such as those engaged in shellfish and seaweed collecting, largely contributed to the decline in family-type managements. (2) The beach-seine fishery showed a steady decline, the number of management units dropping to 1,616 units in fiscal year 1964. This is less than half the

Japan (Contd.):

number in operation in 1953. (3) Enterprises operating powered vessels over 10 gross tons primarily for distant-water fishing generally showed an increase over 1963, but those operating 10- to 30-ton and 200- to 300-ton vessels declined somewhat.

Increase in management units: Enterprises showing an increase were those in the categories of powered vessels under one gross ton, and powered vessels of 30-200 tons and over 500 tons, as well as those engaged in shallow-water fish culture (primarily seaweed culture). (1) The increase in management units operating powered vessels under one ton was due primarily to vessel transfers to this category from the category of unpowered vessels as a result of extensive use of outboard motors. (2) The increase shown in the category of 3- to 5-ton powered-vessel operators, along with the increase in under 1-ton powered-vessel operators, represents an unusual trend in family-type operations, which have shown a decline in all other categories. The number of management units in that category, totaling 14,450 units, represents an 80-percent increase over 10 years ago. (3) Management units in the category of 30- to 200-ton powered-vessel operators engaged in offshore or distant-water fisheries, which had shown a declining trend in earlier years, showed a slight increase in 1964. (4) Management units in the category of over 500-ton vessels operating primarily in distant-water fisheries showed an annual increase--the number of units in 1964 totaled 329. (5) The number of shallow-seas culture enterprises has annually increased, totaling 70,200 units in 1964, close to a threefold increase over 1953. (Suisan Keizai Shimbun, October 27, 1965.)

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ONE-PERCENT TAX ON EXPORTS TO NIGERIA:

The Japanese Government has decided to levy a one-percent assessment on Japanese exports to Nigeria and to use the revenue to promote imports of Nigerian products. This measure was developed as a result of the Nigerian Government's adoption of a policy to prohibit entry of Japanese products unless Japan took steps to promote imports from Nigeria. It was reported that the Japanese Government will not issue export licenses to

those firms engaged in trade with Nigeria unless they pay this assessment.

The one-percent levy is expected to greatly affect the Japanese trawl operators inasmuch as Nigeria is an important market for Japanese Atlantic trawl-caught fish. In Fiscal Year 1964 (April 1964-March 1965) Japan's export of trawl-caught fish to Nigeria totaled 14,413 short tons, valued at US\$2,037,314, far surpassing exports to other countries. (Suisan Tsushin, November 2, 1965.)

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RADAR-BUOY FOR TRACKING FISHING GEAR AT SEA:

A Japanese firm has developed a radar-buoy with which a fishing vessel can locate fishing nets, long lines, and other vessels. The device is made so that the buoy receives impulses transmitted by a radar and sends them back to a vessel's receiving set. Therefore, a net or fishing line marked at sea with the buoy can be relocated by radar. The current source of the buoy is set so that it works only when a radar is transmitting. Thus one battery for the buoy will last 150 hours.

The price is 200,000 yen (US\$556) for the buoy, and 600,000 yen (\$1,667) for the receiving set and adjuster for the vessel.

The Japanese firm developing the radar-buoy has also developed a small or medium-size marine radar which it claims is almost equal in capacity to larger radar equipment. By using a variable sweep apparatus in the new radar, a distance 50 percent greater than the graduated distance can be detected. The maximum range claimed for the new radar is 75 nautical miles. If an off-center apparatus is used at the same time, it is said to be possible to shift the center of the reflection so that a sphere three times as large as the field can be caught. The new radar is priced at 2 million yen (\$5,556) for an alternating-current radar and 2.2 million yen (\$6,111) for a direct-current unit. (Nihon Keizai, November 10, 1965.)

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FISH-FINDER FOR TRAWL GEAR DEVELOPED:

A new wireless remote-control fish-finder for deep-water trawling, reputed to be the first of its kind has been developed by the

Japan (Contd.):

Furuno Electric Company of Japan. The equipment consists of a 200-kilocycle ultrasonic wireless transmitter (attached to the trawl net) which probes the adjacent area and transmits signals to the trawl vessel through a 50-kilocycle ultrasonic receiver, which is towed ahead of the net. Readings are taken by a recorder on the vessel. This new gear (which is said to enable continuous shipboard observation of fish entering the net, condition of net, obstacles, and clearance of the net above the bottom) was tested successfully by several large Japanese stern trawlers operating in the North Pacific Ocean. It is reported that use of this equipment makes it possible to eliminate net damages caused by over-catch, reduce operating time, avoid snagging, as well as recover lost nets (by tracing signals). The gear, which is made to withstand water pressure to a depth of 1,200 meters (3,936 feet), has a range of 2,000 meters (6,560 feet), and is said to perform without fault at vessel speeds of up to 8 knots. (Suisan Keizai Shimbun, October 21, 1965.



Republic of Korea

TUNA FLEET EXPANSION
CAUSES CONCERN IN JAPAN:

Japanese tuna industry circles are concerned about the possibility of fishing competition, particularly in the Atlantic, from South Korea's expanding tuna fleet, according to an article in the Japanese periodical Nihon Keizai, October 31, 1965. The article stated:

(1) At least 21 tuna vessels are being built in South Korean shipyards with financial aid from United States interests.

(2) At least 76 tuna vessels are to be imported by South Korea from a French-Italian group.

(3) Many of the new Korean vessels are expected to enter the Atlantic tuna fishery, causing competition in an area which has been monopolized by Japan.

(4) Japanese tuna fishing interests are concerned about their declining catch rates and would prefer that other countries not expand their tuna fisheries.

(5) The proposed Japanese fishery aid funds (US\$90 million) for Korea under the pending normalization agreement between the two countries could increase competition rather than cooperation between Japanese and Korean fisheries.

The article concluded by calling on the Japanese Government to consider the competitive position of the Japanese tuna industry in any adjustment measures that might be proposed.

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TUNA VESSELS IMPORTED FROM JAPAN:

Since 1962 Japan has exported to South Korea a total of 42 tuna long-line vessels, consisting of 24 145-ton, 8 175-ton, and 10 215-ton vessels. Of those, 14 145-ton vessels were delivered as complete vessels and the remaining 28 exported in knockdown form for assembly in Korea. Of the 42 vessels, 27 were exported to South Korea in 1965. Included were 11 145-ton refrigerated carrier vessels which were later converted into tuna long-liners at the Japanese port of Shimonsaki. Those vessels were reported operating in the South Pacific out of Espiritu Santo, New Hebrides. The 16 other vessels, consisting of six 175-ton and ten 215-ton vessels, were exported in knockdown form. The six 175-ton vessels were expected to be based at American Samoa. (Suisancho Nippo, November 4, 1965.)



Mexico

SHRIMP FISHERY TRENDS,
JANUARY-SEPTEMBER 1965:

The Mexican West Coast shrimp industry ended the 1964/65 season in mid-July 1965 with the lowest catch in many years. Excellent fishing in the Gulf of Mexico did not offset the decline on the Pacific, and exports to the United States dropped sharply. United States imports of shrimp from Mexico totaled 35.2 million pounds in January-September 1965 as compared with 42.9 million pounds in the same period of 1964.

The outlook for the 1965/66 Mexican shrimp season is uncertain. The West Coast lagoons opened to shrimp fishing on September 1, 1965. For that minor segment of the fishery the ini-

Mexico (Contd.):

tial catches were better than in the previous year.



Fig. 1 - Part of Mexican shrimp fleet at the dock in Mazatlan.

Ocean fishing commenced on September 15, 1965, with indifferent catches through the end of the month. Contract negotiations between vessel owners and fishermen's cooperatives kept most vessels in port during September. Agreement was reached only as a result of Presidential intervention. The cooperatives now receive 54 percent of the proceeds instead of 45, but pay a larger share of the operating expenses.

With the agreement signed, the West Coast fleet was ready to put to sea September 30,



Fig. 2 - Unloading heads-on shrimp from tender-skiiffs at Mazatlan. Shrimp trawlers in right background; general-purpose fishing vessel from Manzanillo in left background.

1965, although many vessels were still repairing damage from the hurricane which struck Mazatlan. The storm sank over 20 vessels. (United States Embassy, Mexico, D.F., October 23, 1965.)

Note: See Commercial Fisheries Review, December 1965 p. 73.



Mozambique

SHRIMP FISHERY OFF COAST SHOWS PROMISE:

Commercial fishing operations have been started on a modest scale to exploit the rich shrimp grounds off the Mozambique coast. Those grounds have been carefully studied and tested by French fishery consultants for several months and the results show that they have an impressive potential.

This new fishing enterprise is being initiated by a Portuguese-South African backed company. A substantial part of the shrimp catch will be exported to restaurants and hotels in South Africa, the United States, and on the Continent of Europe. The company also hopes to become a major supplier of fishery products to Mozambique, including a wide range of canned and frozen fish and shellfish.

Two of the four specially equipped trawlers which have been chartered by the firm started fishing off the coast at the beginning of July 1965. The other two vessels were to join them by the end of August.

Research and test trawling has shown that the shrimpbeds are extremely rich and average catch rates were reported comparable with those in the Gulf of Mexico. Catches off the Mozambique coast were reported consistent over the whole area trawled, and test fishing results have suggested that the shrimp trawling season could extend for 9 months of every year. (The South African Shipping News and Fishing Industry Review, September 1965.)

Note: See Commercial Fisheries Review, June 1965 p. 65.



Pakistan

STATUS OF FROZEN FOODS INDUSTRY UNDER SECOND FIVE YEAR PLAN:

Under Pakistan's Second Five Year Plan (1960-65), an expenditure of 10.6 million rupees

Pakistan (Contd.):

(US\$2.2 million) was proposed for the construction of processing and freezer plants and canneries for shrimp and other fishery products. That sum was later increased to 20.5 million rupees (\$4.3 million).

Some 20 shrimp freezing and processing plants are either operating or in the planning stage for the entire country, most of them located in or around Karachi. Since each plant has a daily freezing capacity averaging 10 long tons (2,240 pounds) when operating 6 days a week, the combined annual capacity has a potential of about 50,000 tons.

Pakistan exports frozen shrimp and other fishery products mostly to the United States, India, and the United Kingdom. In fiscal year 1963/64 Pakistan exported about \$15 million worth of frozen fishery products (including shrimp) and canned foods.

Pakistan's import controls are based on the Imports and Exports (Control) Act of 1950 which empowered the Government of Pakistan to "prohibit, restrict, or otherwise control the import or export of goods of any specified description." Commercial imports into Pakistan are subject to import licensing regulations, with the import policy announced semiannually, and the size and composition of imports governed by the country's balance of payments position. Except for single country licenses issued under bilateral trade agreements, or barter or loan arrangements, import licenses are valid for all countries.

There are five can and carton manufacturing firms in Pakistan that produce containers of acceptable quality. However, most canneries and processors of shrimp and other fishery products for export prefer to import their container and packaging supplies because of superior finish, and their foreign sales representatives generally arrange to supply them with printed labels and other packaging materials.

With continued industrialization and development a prime goal of Pakistan's Third Five Year Plan, there is a large and steadily growing market for canning machinery and packaging materials. Pakistani industrialists welcome investment capital and joint ventures with United States firms interested in setting up manufacturing facilities in a

country in which both investment climate and inducements appear to be favorable.

Note: See Commercial Fisheries Review, October 1965 p. 91.



Peru

FISH MEAL PRODUCTION AND EXPORT FORECAST FOR 1965:

Peruvian fish meal stocks at the start of 1965 were estimated at 270,000 metric tons. In 1965, Peruvian fish meal production is forecast at 1.1 million tons and exports at 1.3 million tons. (United States Embassy, Lima, November 16, 1965.)

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FISH MEAL INDUSTRY--SHORT- AND LONG-TERM OUTLOOK:

Summary: Peruvian fish-meal production was expected to drop sharply in the last quarter of 1965 due to a relatively poor anchoveta spawning season in 1964. The projected decline seems to indicate the need for a conservation program which will probably take the form of a closed fishing season that might vary in length from year to year, depending on spawning results. With stocks being fully exploited, the Peruvian fish-meal industry will no longer be the growth industry that it has been. For the industry, still burdened with excess capacity, the expected drop in output in 1965 and the dimmed longer term prospects for growth point to a continuing process of consolidation and concentration.

Despite high prices for fish meal, there will be some difficult problems ahead. Even at the record output levels of 1964, Peruvian fish-meal plants overall worked at only an estimated 65 percent of capacity. With fixed costs very high, any significant drop in plant use drives unit costs up sharply. Thus it seems that the prospect is for continued plant closings, some decline in employment, and a continuing trend toward more concentration of ownership within the industry.

Production Prospects: Scientists at the Peruvian Instituto del Mar base their catch forecasts on the following reasoning: The life cycle of the anchoveta is about 18 months. Under current conditions of heavy fishing, the quantity of fish landed is a function of the "spawning recruitment." About 4 months are

Peru (Contd):

required for anchoveta spawn to reach commercial size. The extraordinarily large catch of 1964, when meal output rose 38 percent, was attributed to a heavy spawning recruitment in 1963. But the 1963 year-class was fished out when the normal seasonal slump arrived in June 1965. So the anchoveta catch in late 1965 depended on the 1964 year-class, which was about 50 percent below the record 1963 level. Fourth quarter catches in 1965 were therefore expected to be only half of those in the same period of 1964. In January 1966, anchoveta from the 1965 class will bolster the available supply, but to what extent is not yet known.

In the Peruvian fish meal industry, the end of an era may have been reached. From 1965 through 1964, Peruvian fish meal production expanded at a compound annual rate of more than 50 percent. Peruvian fish meal production is now expected to level off with annual production volume probably varying from around 1963's 1.1 million tons to 1965's (forecast) 1.5 million tons. (United States Embassy, Lima, September 22, 1965.)



Poland

NORTHWEST ATLANTIC FISHERY
TRENDS, JULY-AUGUST 1965:

The largest concentration of Polish vessels on Georges Bank during the summer of 1965 appeared in September when 5 Polish stern trawlers and 1 side trawler were seen fishing on Cultivator Shoals. Earlier in the summer, 11 Polish stern trawlers were operating off Labrador. The buildup of the Polish fleet on Georges Bank may indicate a trend toward an increased Polish fishing effort in waters off the United States coasts. Poland's largest fishery research vessel, the 800-ton Wieczno, completed a 35-day survey off Labrador in May 1965 and was scheduled to conduct a similar survey on Georges Bank.

Following are excerpts from the Polish Maritime News, September 1965, describing Polish North Atlantic fishery activities in July-August 1965:

In early August 1965, the Polish research vessel Wieczno left Gdynia for an exploratory

trip to fishing grounds in the northwest Atlantic. A team of Polish scientists planned to test new types of trawls. (Editor's Note: The Wieczno's exact area of operations during the August cruise is not known.)

The Polish freezer trawler Finwal left on her maiden voyage for the Atlantic grounds of Georges Bank. The vessel is the second Polish "B-18-type" trawler of 1,300 dead-weight tons dispatched to the area. Poland's Odra Deep-Sea Fishing Enterprise intends to start systematic fishing on Georges Bank with large freezer-trawlers.

Polish factory trawlers operating on the northwest Atlantic grounds had daily catches of only about 15 to 20 metric tons during July and the first half of August 1965.

On her maiden voyage to the northwest Atlantic, the Polish freezer-trawler Andromeda (B-15 or Leskov class) caught a total of 2,235 tons of ocean perch, cod, and flatfish.

Polish advisers are employed on two Rumanian factory trawlers built in Japan. On each of the vessels the following 5 Polish specialists are employed for a period of 6 months: captain, fishing officer, processing-machines engineer, and 2 fishermen. The Rumanian factory trawlers are operating on the Atlantic grounds.

Note: See Commercial Fisheries Review, Nov. 1965 p. 32; Oct. 1965 p. 41 and 94; May 1965 p. 85.

* * * * *

LANDINGS AND FISHERY TRENDS,
JANUARY-JUNE 1965:

In the first half of 1965, the Polish fishing fleet gained 1 new factory trawler, 3 freezer trawlers, and several cutters. Polish landings of salt-water fish in January-June 1965 amounted to almost 127,000 metric tons, a gain of about 14,000 tons over the same period of 1964. The increase was due mainly to heavier landings of flatfish, ocean perch, North Sea herring, and unclassified fish from African fishing grounds. Landings were down somewhat for mackerel and sprat. During the first half of 1965, Polish vessels supplied the their home market with 63,000 tons of fish and fishery products--a gain of 1 percent over the same period of 1964.

A new fishery cold-storage and processing plant as well as a repair yard for cutter vessels are being built at the Polish harbor of

Poland (Contd.):

Polish Landings of Salt-Water Fish, January-June 1965 ^{1/} with Comparisons						
Species	State-Owned Enterprises	Cooperatives	Private Fishermen	Total First Half 1965	Total First Half 1964	Total Year 1964
(Metric Tons)						
Salmon	0.5	59.9	32.6	93.0	129.5	355.9
Eel	0.1	13.0	62.2	75.3	68.0	153.7
Baltic herring	3,954.4	1,783.3	297.2	6,034.9	6,201.8	18,844.2
North Sea herring	25,784.4	-	-	25,784.4	21,273.6	94,371.8
Sprat	12,029.7	2,188.5	729.0	14,947.2	15,520.9	17,693.4
Cod	28,951.3	5,916.8	4,033.8	38,901.9	39,618.4	53,563.5
Flatfish	5,761.0	216.4	355.3	6,332.7	2,406.7	6,472.0
Mackerel	4,559.0	-	-	4,559.0	6,696.4	10,653.9
Ocean perch	14,483.6	-	-	14,483.6	11,388.2	21,414.6
Other salt-water fish ^{2/}	14,641.4	36.1	96.5	14,774.0	8,305.3	18,116.3
Brackish-water fish	-	826.9	168.5	995.4	1,099.6	2,745.5
Total	110,165.4	11,040.9	5,775.1	126,981.4	112,708.4	244,384.8

1/Preliminary.

2/Includes catch off Africa.



Routes of Polish fishing trawlers to fishing grounds.

Ustka at a cost of about 100 million zloty (US\$4.17 million).

Polish vessels of Gryf cooperative of Szczecin planned to land about 500 tons of herring in the summer of 1965 at the Norwegian port of Hangesund, for Norwegian

buyers. (Polish Maritime News, No. 85, September 1965.)

Notes: (1) Polish zloty 24.0 equal US\$1.00.

(2) See Commercial Fisheries Review, June 1965 p. 74, and Dec. 1964 p. 110.

FISHING VESSELS MAY BE ORDERED FROM DENMARK AND EAST GERMANY:

Factory stern trawlers may be built in Denmark for Poland's fishing fleet. Negotiations to that end were being conducted in the fall of 1965 under the new Danish-Polish trade agreement. The discussions were concerned with the construction of 6 to 10 "B-22-type" factory stern trawlers--an improved version of the "B-15." (The latter has an overall length of about 279 feet, breadth 45 feet, draft 18 feet, gross tonnage 2,670, speed 12.5 knots, cruising range 70 days, and a crew of 110.)

Reports indicated that a final decision on the construction of the Polish trawlers might be made in January 1966. The contract might call for 10 B-22's or, as an alternative, 6 B-22's and 2 or 3 refrigerator transport vessels, the total cost being the same in each instance.

Specific data on the B-22 design are not available, but it has been suggested that they might carry four lines of filleting machines--to handle cod, haddock, pollock, ocean perch, and flatfish--and contact plate freezers with a capacity of 20 tons in 24 hours as well as blast freezers with a capacity of 10 tons in 24 hours. It is possible that Poland may wish to build their first vessels with contact freezers in a foreign yard where such equipment as plate freezers might be easier to obtain.

Poland (Contd.):

Blast freezers on current Polish factory trawlers are unable to produce satisfactory the precisely dimensioned fish blocks needed to meet the terms of a contract a large Polish State fishing enterprise has with a United States firm. The main reason, however, for the proposal to build Polish vessels in Denmark is said to be the Danish-Polish trade agreement which requires that Poland buy Danish products in return for the coal and other products it sells to Denmark.

at Porto Novo, Madeira, with a warehousing capacity of 250-750 tons, and studies were under way for the construction of a similar plant at Vila Real de Santo Antonio in Portugal. In the Azores, the low prices for tuna have not yet given the industry the necessary incentive to carry out a plan of this nature. There are, however, plans for the construction of a refrigerated plant at Horta in the Azores which will be built by a company recently formed. The new company will also build two tuna vessels with refrigerated holds.

Table 1 - Portuguese Landings of Tuna and Similar Species by Areas, 1961-64

Areas	1964			1963			1962			1961		
	Quantity		Value	Quantity		Value	Quantity		Value	Quantity		Value
	Metric Tons	1,000 Es.	US\$ 1,000	Metric Tons	1,000 Es.	US\$ 1,000	Metric Tons	1,000 Es.	US\$ 1,000	Metric Tons	1,000 Es.	US\$ 1,000
Algarve	521	4,916	1,699	640	5,929	2,049	805	7,442	2,572	1,541	12,211	4,219
Madeira	3,438	12,818	4,429	2,847	11,246	3,886	2,799	11,125	3,844	1,123	5,904	2,040
Azores	1/4,472	11,587	4,004	9,226	23,867	8,247	6,138	14,317	4,947	5,196	11,829	4,087
Total	2/8,431	29,321	10,132	2/12,713	41,042	14,182	2/9,742	32,884	11,363	2/7,860	29,944	10,346

1/Data are for 11 months.

2/Does not include tuna caught by two vessels for which data are unavailable.

Note: 1,000 escudos equals about US\$35.00.

It has also been mentioned that Poland might order five fishing vessels similar to the B-22's from East Germany in exchange for the equivalent in trading, or transport vessels to be built in Poland. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, November 17, 1965.)



Portugal

TUNA FISHERY TRENDS, 1961-64:

Although Portugal is in an excellent geographic location for fishing tuna in waters around the Madeira Islands, Azores, Cape Verde, and in the South Atlantic off the Angola coast, landings of that species represent only a small fraction of Portugal's total commercial fishery landings. The reason is because tuna fishing and facilities have not been modernized.

With the establishment of the Tuna Fishing Guild in November 1960, efforts have been made to change this situation by interesting fishery operators in organizing companies for carrying out plans for the construction of an oceangoing fleet and shore refrigerated plants. Construction of a refrigerated plant was completed this past year

Work on the construction of two other steel-hulled tuna vessels, with a cargo capacity of about 150 tons, was expected to begin shortly. Their home ports will be in the Province of Algarve in the southern part of Portugal and in Madeira.

According to preliminary data from the Tuna Fishing Guild, landings by registered operators in 1964 (5 fixed traps in the Algarve, 48 vessels in Madeira, and 72 vessels in the Azores) of tuna and tuna-like species dropped 34 percent from the previous year's landings, and the value was down 29 percent.

Table 2 - Metropolitan Portugal's Use of Tuna Landings, 1963-64

By Areas	1964	1963
... (Metric Tons) ...		
For Canning:		
Algarve	461	507
Madeira	1,834	1,444
Azores	4,471	9,226
Total for canning	6,766	11,177
Local Consumption:		
Algarve	61	133
Madeira	1,604	1,403
Total for local consumption	1,665	1,536
Total landings	8,431	12,713

Data show that the five traps in the Algarve continued to yield smaller and smaller catches from year to year, and that the 1964 land-

Portugal (Contd.):

ings in Madeira increased 20.7 percent from the previous year. A sharp drop of 52 percent in landings at the Azores is largely attributed to bad weather which kept many of the vessels from leaving port. (United States Embassy, Lisbon, May 29, 1965.)



South Africa Republic

PELAGIC SHOAL FISH CATCH, JANUARY-JULY 1965:

South Africa Republic: The Cape west coast shoal fish catch for the 7-months season through July 1965 was 222,920 short tons pilchards, 44,753 tons maasbanker, 43,967 tons mackerel, and 129,457 tons anchovy. The total catch was 441,097 tons. In the same period of 1964 the total catch was 387,353 tons, made up of 282,301 tons pilchards, 22,121 tons maasbanker, 57,222 tons mackerel, and 25,709 tons anchovy.

The January-July 1965 Cape shoal catch yielded 102,117 short tons of fish meal, 4,276,194 gallons of fish body oil, 1,453 short tons of canned pilchards, 4,761 short tons of canned maasbanker, and 4,933 short tons of canned mackerel.

South-West Africa: In the Territory of South-West Africa, the shoal catch in January-June 1965 totaled 516,163 short tons and consisted of 515,879 tons pilchards and 284 tons anchovy. (South African Shipping News and Fishing Industry Review, August and September 1965.)



U.S.S.R.

SHRIMP FISHING ACTIVITY IN GULF OF ALASKA INCREASED:

A Soviet shrimp fishing fleet has been sent to the Gulf of Alaska for the first time by a Vladivostok marine products trading company controlled by the Soviet Far Eastern Main Fisheries Administration. At the end of October 1965, that fleet (made up of 7 medium freezer trawlers and some support vessels) started operations east of the Shumagin Islands, with additional vessels scheduled to join them later. Most of the shrimp caught

were to be exported, mainly to Japan. Up to that time, commercial shrimp fishing in the eastern Bering Sea supervised by that Soviet Administration was mostly intermittent.

Extensive scientific research by the Soviets had shown abundant resources of shrimp throughout the eastern Bering Sea and Northeast Pacific but they lacked proper fishing vessels to start that fishery. In 1962-63 the Soviets began mass production of a new type of medium trawler with freezing capacity (the so-called Maiak or SRTM class of trawler), and decided to enter the shrimp fishery on a worldwide basis.

The first SRTM's were added to the Soviet Pacific fishing fleet in late 1963. By spring 1964, two vessels of that type began shrimp fishing operations north of the Pribilof Islands in an area normally fished by the Japanese. The Pribilof operations, however, were soon discontinued and in late October 1964 the Soviets began a limited shrimp fishery near the Two Headed Island southwest of Kodiak Island in an area also fished by the Japanese. That was the first known Soviet commercial shrimp fishery in the Gulf of Alaska.

In 1965, the Soviets continued their sporadic shrimp fishing operations in the Gulf of Alaska from February until August. The two principal fishing areas were off Kodiak Island (until early May) and east of the Shumagin Islands. It was not until October 1965 that commercial operations on a larger scale were begun.

The Maiak class side trawlers were originally built to chill and freeze herring and bottomfish. But with the constantly decreasing demand for herring, many of them were assigned to shrimp fishing. With a crew of about 30, those 167-foot long vessels with a gross tonnage of 700 tons can freeze up to 6 metric tons a day. Frozen products are kept at 0° F.

The Soviets are also reported to be fishing for shrimp in the Atlantic Ocean off the African coast, in the Indian Ocean (Gulf of Aden and Persian Gulf), and in the South Atlantic and Antarctic Oceans.

* * * * *

U. S. S. R. (Contd.):

DEEP-WATER TRAWLING IN BARENTS SEA:

In 1964, the fishing vessels of the Soviet Northern Fisheries Administration (with headquarters at Murmansk) began to fish in the Barents Sea for halibut at depths of from 700-900 meters (2,300-2,950 feet). From February to mid-June 1965, Soviet catches taken by deep-water trawling in the Barents Sea amounted to 26,700 metric tons of which halibut catches amounted to 8,000 metric tons. At least 18 large trawlers were involved in that fishery. (Rybnoe Khoziaistvo, No. 8, 1965.)

* * * * *

TRAWLING FLEET OFF SOUTH-WEST AFRICA IN JULY 1965:

About 40 Soviet fishing vessels were reported to be operating about 100 miles north of Walvis Bay in South-West Africa during July 1965. The Soviets have maintained trawling operations off South-West Africa since 1961. (The South African Shipping News and Fishing Industry Review, September 1965.)

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OFFSHORE FISHING FLEET STATUS, MAY 1965:

In May 1965, the Soviet Union operated over 80 base and motherships in support of her fishing vessels, according to available reports. More than 70 percent of all large ocean-going Soviet fishing vessels are less than 10 years old. The Soviet trawler fleet alone numbers an estimated 4,000 units employing about 180,000 men. The total number of persons employed in the Soviet fishing industry reportedly exceeds 600,000.

* * * * *

PAIR FISHING INCREASES HERRING CATCHES IN 1964:

In 1964, the Soviet Far East Fisheries Administration introduced pair fishing on a large scale. In the entire Soviet Far East Fisheries Administration, 34 pairs of vessels fished in 1964 and caught about 30,000 metric tons of herring. The Soviets claim pair fishing increases catches and reduces costs. For instance, Kamchatka fishermen caught 50,000 tons of herring in 1964 instead of the planned 33,400 tons. In the Kamchatka fisheries, the cost of catching 100 kilograms (224 pounds) of herring was reported to be 1.01 rubles (US\$1.12) for pair fishing as compared with

3.24 rubles (\$3.60) for drift-net fishing. In the entire Far East Fisheries Administration, savings of about 669,000 rubles (\$742,590) were reported as a result of the introduction of pair fishing in 1964.

The Soviets also introduced pair fishing in the Western Fisheries Administration, which has headquarters at Riga on the Baltic Sea. In 1964, that Administration caught 70,000 metric tons of herring by pair fishing, and the cost decreased from 12 rubles (\$13.32) per 100 kilograms of herring caught with drift nets to 2.5-3 rubles (\$2.78-3.33) per 100 kilograms when herring was caught by pair fishing. (Rybnoe Khoziaistvo, No. 8, 1965.)

Note: 0.9 Soviet ruble equals US\$1.

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EXPLORATORY FISHERY EXPEDITION TO EASTERN PACIFIC:

To find new fishing grounds for tuna, mackerel, sardines, and other fish, the Soviets have begun a major expedition known as the "First Joint Oceanographic and Fishery Research Expedition to the Eastern and Tropical Pacific." Two of the six research vessels participating left the Soviet Far East port of Vladivostok in mid-October 1965. They are the Lira and the Vnushitelnii. The remaining four vessels, among them the Iskatel and the Kanopus, were to leave before the end of October.

Over 40 fishery scientists and oceanographers belonging to the Soviet Pacific Scientific Research Institute for Fisheries and Oceanography (TINRO) at Vladivostok, or to the Institute of Zoology at Leningrad are participating. The main purpose of the expedition is to find new fishing grounds for the rapidly expanding Soviet fishing fleet.

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SOVIET FISHING WITH LIGHTS AND ELECTRICITY TO BE EXPANDED:

In 1960, the Soviet Union caught less than 200,000 metric tons of fish by electric-light and electric-field fishing. Much greater use of those fishing methods is outlined in the Soviet 5-year plan for 1966-1970. According to that plan, by 1970 over 700 Soviet vessels are to be fishing with electrical current and/or electric lights. They are expected to catch almost one million metric tons of fish. The largest expansion with those two methods will

U.S.S.R. (Contd.):



Pump fishing with light attraction for sprat (kilka) in the Caspian Sea off Baku aboard a Soviet vessel. The man on the left stands on the drive-shaft housing between the electric driving motor (left) and the fish pump (near his right foot). The suction hose can be seen passing under the fish box and over the railing on the right. The man is holding on to the water/fish separator; the fish trickle down the chute into a hopper (center) while the water flows back into the sea.

come in the Pacific saury fishery and the Atlantic tropical sardine fishery. Electric-light fishing for Black Sea kilka (sprat) is already heavily exploited. (*Rybnoe Khoziaistvo*, No. 8, 1965.)



United Arab Republic

FISHERY TRENDS, 1965:

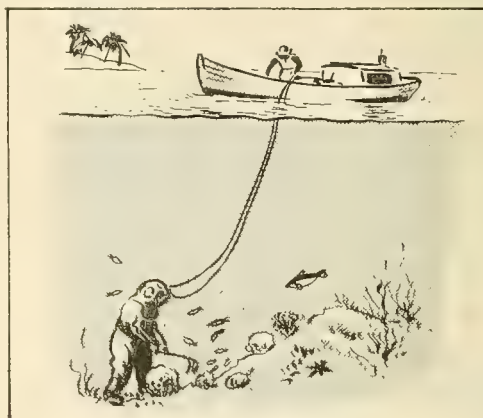
Summary: Major developments in the fishing industry of the United Arab Republic (U.A.R.) in 1965 included the signing of the U.A.R.-U.S.S.R. fishing agreement on June 1, 1965; the opening of the Anfoushy Secondary School for Aquatic Resources in Alexandria; the planning of an institute of marine sciences at university level; and the Egyptianization of sponge fishing off the country's Mediterranean coast.

Anfoushy Secondary School for Aquatic Resources: The Anfoushy Secondary School for Aquatic Resources opened in Alexandria on September 18, 1965, with a student body of 150. Preparatory work for the school had been done by a fisheries advisor loaned to the Egyptian General Organization for Aquatic Resources (GOFAR) by the U. S. Ford Foundation. Plans for the school envision a 3-year course including studies in general science, mathematics, languages, and social

sciences as well as technical subjects relating to the fishing industry such as navigation, mechanics, marine biology, and meteorology. The Ford Foundation has provided a grant of US\$90,000 for the school.

Institute of Marine Sciences and Fisheries: According to press reports, the U.A.R. Ministry of Scientific Research has prepared a plan for a new Institute of Marine Sciences and Fisheries. Further planning for the Institute is being done by the University of Alexandria and the GOFAR, working with a scientist from Iowa State University assigned to the project by the Ford Foundation.

Sponge Fishing: In past years the U.A.R. Government gave Greek fishermen exclusive rights to fish the Egyptian coast of the Mediterranean for sponges. The Greeks were allowed to keep 80 percent of the catch, turning over the balance to the Egyptians. In 1965, the Egyptians took over all sponge fishing in their coastal waters, and the concession for the area between Alexandria and the Libyan border was given to an Alexandria firm which is affiliated with GOFAR. That company owns and operates 9 sponge fishing vessels, 4 supply ships and 1 survey launch. They are manned entirely by Egyptians, each vessel having a crew of 10 or 11 men.



Sponge fishing.

The company has divided its concession area into 4 parts, fishing only 2 sections each year in order to allow sponges to mature. A new sponge bed has been discovered east of Sidi Abd el Rahman, where the most valuable of the three types of Egyptian sponges, the "Turkey cup," is found. For that type of sponge, Japanese buyers are prepared to pay \$90 a kilo. For the "Zimoga" sponge, the Japanese offer \$76 a kilo.

United Arab Republic (Contd.):

The Egyptian sponge season lasts from May until October. By mid-September 1965, according to an official source, the Egyptian sponge catch amounted to 3.5 tons and it was hoped that another 1.5 tons would be added before the end of the season.

Although the sponge has been replaced by the synthetic article, Egyptian sponges are still highly prized for polishing china and tanning leather.



Lake Fisheries: There has been a lengthy dispute between the proponents of drying up the Egyptian coastal lakes and reclaiming the land for agriculture on the one hand, and on the other those who argue that the lakes should be kept for fishing and stocked. It now appears that the argument, at least as far as Lake Mariut is concerned, has been resolved in favor of the fishermen since it has been proved conclusively that the value of fish caught in the lake far exceeds what could be earned by reclaiming and farming the land.

In 1962, the catch in Lake Manzala near Port Said was estimated at 170 metric tons and that in Lake Idku at 17 tons. It was estimated that the 1965 catch in Lake Burullus (east of Rosetta) would reach 1,000 tons of fish, and that the Lake Burullus catch could be increased to 2,000 tons.

Experts in the Hydrobiological Institute in Alexandria have been studying ways of ac-

climatizing marine fish to life in Lake Qarun, since fresh-water fish in Lake Qarun are now almost extinct due to the increasing salinity of the water. An officer of the Institute stated that the salinity of the lake has now reached 28 parts per thousand as opposed to 38 per thousand in the Mediterranean. He reported that mullet and sole fry have been introduced in Lake Qarun with excellent results.

The Institute has also prepared a study on the "Lake Nasser Fisheries Development Plan." Lake Nasser will be created by the Aswan High Dam.

In order to increase the fish population in existing lakes, the Hydrobiological Institute has established a fish farm on Lake Mariut, and £E 35,000 (US\$80,500) was devoted to that project in 1965. Of a total of 1,000 fed-dans (1,038 acres) in the fish farm, 300 fed-dans (311 acres) have been set aside for fry.

On November 5, 1964, the *Progres Egyptien* reported that large blue crabs originating in the Indian Ocean have now migrated north up the Red Sea, into the Mediterranean, and thence into the Egyptian coastal lakes where they have multiplied and become a serious threat to the fish of the lakes. The Hydrobiological Institute has now embarked on a dual program to teach fishermen how to catch those crabs on the one hand and to teach the Egyptian public how to cook them on the other.

Coastal Fisheries Development: In a ceremony in Alexandria on September 4, 1965, the Governor of Alexandria turned over to representatives of the city's Fishermen's Cooperative Society 10 motorized fishing boats. The press reported that 60 such boats had been distributed to fishermen's cooperatives in Koseir, Hurghada, and Tor in line with a Government effort to convert the Egyptian fishing fleet from sail to motor.

In the planning stage are the construction of a fishing port at Damietta, fishing projects in the Red Sea and Rosetta, and a plant for the extraction of oil from fish of the Red Sea.

Marketing: In mid-July 1965, the press reported complaints about the reduced quantity of fresh fish offered in the Alexandria market. *Le Progres Egyptien* announced on July 14 that the supply had fallen 36 percent in the first 4 months of 1965 from that in the same period of 1964. Perhaps because of that shortage as well as because of reported increases in the price of fish, the Govern-

United Arab Republic (Contd.):

ment announced in September 1965 that fish would henceforth be marketed through Government-controlled cooperatives. Prices were uncontrolled during the month of October, but ceilings were placed on them in November to be revised every 2 weeks. (United States Consulate, Alexandria, November 10, 1965.)

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FOREIGN TRADE IN FISHERY PRODUCTS, 1964:

Imports: In 1964, imports of fishery products by the United Arab Republic (UAR) totaled 6,201 metric tons valued at £E604,458 (US\$1,390,253). Canned and preserved fishery products accounted for 57 percent of the quantity and 98 percent of the value of the 1964 fishery imports. Included in that category were 756 tons of canned tuna, 607 tons of cured herring, 212 tons of other cured fish, and almost 2,000 tons of other canned or preserved fishery products.

Exports: Fishery exports by the UAR in 1964 totaled 2,210 tons valued at £E805,823 (\$1,853,393). The 1964 shipments of fresh and frozen shrimp, the main fishery export item, totaled 1,355 tons valued at £E613,651 (\$1,411,397). The exports also included 111 tons of salted or dried shrimp, 572 tons of fresh or frozen fish, and 118 tons of cured fish. (United States Consulate, Alexandria, November 10, 1965.)



United Kingdom

SALES COMPANIES IN UNITED STATES FORMED BY BRITISH FOOD FIRM:

The overseas marketing organization of a large British food firm is to form two fishery sales companies in the United States. The two new companies will be mainly concerned with the marketing of frozen spiny lobster tails and shrimp from the parent company's fishery operations in Australia and the Middle East.

The two companies in the United States will have their headquarters in New York City and Los Angeles, Calif. The New York unit, being formed in association with a U.S. firm, will handle all United States East Coast

and Midwest sales. The unit in Los Angeles, also in association with a U. S. firm, will be responsible for West Coast sales.

The managing director of the British food firm's International Division says that 1966 sales are estimated at over \$5 million. In 1967, sales are expected to increase substantially as expansion programs in Australia and the Middle East get under way. Also, frozen fishery products of the British firm's subsidiary in St. Johns, Newfoundland, will be available for marketing in the United States in 1967.

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FIRM CONTRACTS FOR SOVIET CANNED SALMON AND CRAB MEAT:

A £1,250,000 (US\$3.5 million) contract was signed in fall 1965 between the Soviet Union and a British firm for canned salmon and crab meat to be imported by Great Britain during the following six months. The agreement is the third to be negotiated between the British food company and the Soviets. The British firm is the sole distributor of Soviet fishery products in the United Kingdom and has the option of future supplies as agreed in previous contracts. (*Fishing News*, October 15, 1965.)

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FISHERY LOAN INTEREST RATES REVISED:

The British White Fish Authority rates of interest on loans made after October 2, 1965, are:

Fishing vessels of not more than 140 feet, new engines, nets, and gear: on loans for not more than 5 years, $7\frac{1}{4}$ percent (decrease $\frac{1}{8}$ percent); on loans for more than 5 years but not more than 10 years, $7\frac{1}{8}$ percent (decrease $\frac{1}{8}$ percent); on loans for more than 10 years but not more than 15 years, $7\frac{1}{8}$ percent (no change); on loans for more than 15 years but not more than 20 years, $7\frac{1}{8}$ percent (decrease $\frac{1}{8}$ percent).

The rate to processing plants for loans of not more than 20 years is unchanged at $7\frac{3}{4}$ percent.

The rates on loans made before October 2, 1965, are unchanged. (*Fish Trades Gazette*, October 16, 1965.)

Note: See *Commercial Fisheries Review*, Dec. 1965 p. 82.

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United Kingdom (Contd.):

NEW TRAWLERS FROM OLD HULLS:

Four middle-water trawlers are being lengthened and converted from steam to diesel power for distant-water fishing by a large British fishing company. In the fall of 1965, the Ross Kelly was cut in half in a Grimsby shipyard to enable a 23.5-foot prefabricated section to be inserted. The new section will lengthen the vessel to 163 feet. The other



Shows middle-water trawler Ross Kelly cut in half on a Grimsby slipway. The vessel is being lengthened for distant-water fishing.

trawlers to be converted in the 2-year program are Ross Kipling, Ross Kashmir, and Ross Kelvin, all built in 1956-58 for fishing off the Faroe Islands. Cost of the conversion program is £600,000 (US\$1.68 million).

Since 2 other trawlers were similarly lengthened in 1963, their earnings have increased by 50 percent.



Yugoslavia

NEW TUNA VESSELS OUTFITTED FOR ATLANTIC FISHING:

In the fall of 1965, it was announced at a Yugoslav conference in Izola that three new Yugoslav tuna vessels would be outfitted as soon as possible for their maiden voyage to the Atlantic (probably off the West Coast of Africa). Previous reports indicate that those vessels are 145-foot purse seiners with a carrying capacity of 475 metric tons of tuna. They were built at Pula for a Yugoslav fishing company, also of Pula.

In 1963, Yugoslavia imported over 12,000 tons of Japanese frozen tuna, most of which was canned for re-export, according to Japanese reports.

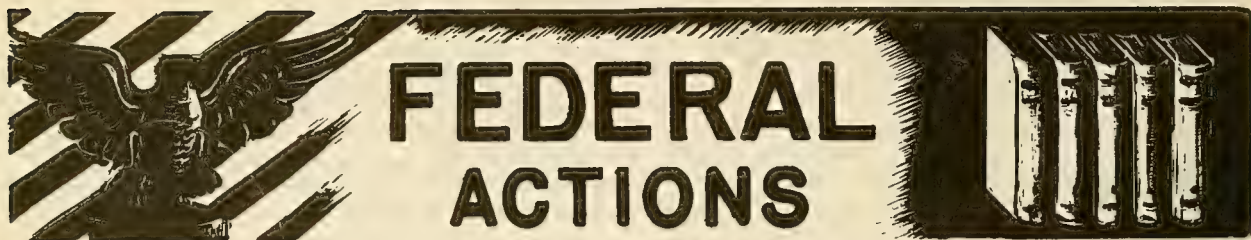
In the past, Yugoslavia has been limited mainly to Adriatic fishing, and the country's annual catch has been only 20,000 to 25,000 tons of fish. A proposed 1964-1970 Development Plan calls for Yugoslavia to add 40 ocean fishing vessels to its fleet and to increase its annual catch to 120,000 metric tons by 1970.

Note: See Commercial Fisheries Review, Jan. 1965 p. 96; Sept. 1964 p. 115; Mar. 1964 p. 56.



JAPAN'S CULTURED PEARL INDUSTRY

Production of cultured pearls in Japan has risen to US\$55.5 million a year. About 90 percent of the pearls are exported, and in 1963 exports totaled \$46.6 million, double those in 1959. The United States now takes about 40 percent of exports, and Switzerland 20 percent. The remainder go to West Germany, Hong Kong, France, Italy, and India. (Australian Fisheries Newsletter, November 1964.)



Federal Committee on Pest Control

PESTICIDE MONITORING PROGRAM APPROVED:

A comprehensive program to monitor levels of pesticide residues in people, fish and wildlife, food and feed, soil, and water in the United States has been approved by the Federal Committee on Pest Control (FCPC).

The FCPC, an interagency group, reviews all pest control activities conducted by Federal Departments or financed wholly or in part with Federal funds. Members of the FCPC include representatives of the Departments of Agriculture; Health, Education, and Welfare; Interior; and Defense.

The objective of the monitoring program is to determine the extent to which pesticide residue levels exist in the United States and to detect such increases or decreases as may occur in the future. Data developed by the program will be made widely available through the publication of summaries and by other means.

The program incorporates some Federal pesticides monitoring which the Departments have had under way for several years.

The program, developed by the FCPC Subcommittee on Pesticide Monitoring, represents action by Federal Departments to coordinate and expand pesticide monitoring efforts in principal elements of the national environment. During the first year of the program, FCPC members expect to learn if details of the plan are workable and if it should be expanded. Environments being considered for inclusion are air, lakes, and ground water in which technical problems now make pesticide measurements difficult.

Fish: The monitoring of fish by the Department of Interior will attempt to inform

scientists about aquatic environmental conditions in which fish live. This may provide the basis for intensive studies on the meaning of pesticide levels to the physiological processes of fish.

A minimum of three species of fish in various parts of the United States will be studied for the presence of pesticide residues. The species will vary according to location. They should reflect the degree of residues in organisms upon which they have fed. The order of preference in fish to be sampled is: carp, buffalofish, black bass, channel catfish, green sunfish, yellow perch, rainbow trout, and squawfish.

Samples will be taken at 50 sites twice a year, as close to April and October as possible. These times will show the possible effect of the summer use of pesticides.

Major estuaries, where salt and fresh water meet, and major river drainages containing commercial quantities of shellfish will be included in the program. Oysters and clams, which filter large amounts of water to obtain food, will be studied. Samples of such shellfish and sediment will be taken three times a year.

Water: Fifty-five locations, covering all of the major river drainages, will be sampled by the Department of Health, Education, and Welfare or by the Department of the Interior to provide continuing information on pesticide residues in the nation's water supply.

Rivers generally will be sampled at places where they empty into other bodies of water. Some samples will be taken at upstream locations. Samples will be taken monthly and will be analyzed to a sensitivity of one part of pesticide to one trillion parts of water.

Other Studies: The pesticide monitoring program will also include (1) the continued surveillance of pesticide residues in food and feed by the Food and Drug Administration in cooperation with the Department of Agriculture; (2) the sampling of soil by the Department of Agriculture to determine the rate of accumulation of certain pesticides; and (3) studies of pesticide residues in people by the Public Health Service.



General Services Administration

FEDERAL SUPPLY SERVICE

NEW FEDERAL SPECIFICATIONS FOR CANNED SARDINES, CANNED SHRIMP, AND CANNED TUNA:

New Federal Specifications for canned sardines, canned shrimp, and canned tuna have been approved for the use of all Federal Agencies by the Commissioner, Federal Supply Service, General Services Administration. The new specifications were developed by the U. S. Bureau of Commercial Fisheries in cooperation with industry producers and Government buyers.

The new specifications include the following sections: (1) Scope and Classification; (2) Applicable Specifications, Standards, and Other Publications; (3) Requirements; (4) Sampling, Inspection, and Test Procedures; (5) Preparation for Delivery; and (6) Notes.

Federal Specification PP-S-51g, Sardines, Canned, effective September 7, 1965, supersedes Int. Fed. Spec. PP-S-0051f (INT-FWS) of December 5, 1962, and Fed. Spec. PP-S-51d of April 11, 1957.

Federal Specification PP-S-311c, Shrimp, Canned, effective September 3, 1965, supersedes Int. Fed. Spec. PP-S-00311b (INT-FWS) of August 9, 1963, and Fed. Spec. PP-S-311a of September 8, 1955.

Federal Specification PP-T-771b, Tuna, Canned, effective September 20, 1965, supersedes Int. Fed. Spec. PP-T-00771a (INT-FWS) of June 23, 1962, and Fed. Spec. PP-T-771 of March 31, 1931.

Copies of the new specifications may be purchased from the U. S. Government Printing Office: price 5 cents each for those on

canned tuna or canned shrimp; 10 cents each for those on canned sardines.



Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Bert Arthur Bender, 7730 Sunnyside Avenue North, Seattle, Wash. 98103; has applied for aid in financing the purchase of a used 30-foot wood gill-net vessel to engage in the fishery for salmon in the Cook Inlet area of Alaska. Notice of the application was published by the U. S. Bureau of Commercial Fisheries in the Federal Register, November 10, 1965.

Julius R. Majdic, Post Office Box 2018, Kodiak, Alaska 99615, has applied for a loan to aid in financing the purchase of a new 32-foot wood combination seine and gill-net vessel to engage in the fishery for salmon in the Kodiak area of Alaska. Notice of the application was published in the Federal Register, November 10, 1965.

James H. and Leola E. Baumgartner, 1337 Montana Street, Coos Bay, Oreg., have applied for a loan to aid in financing the purchase of a used 45.3-foot registered length wood trolling vessel to engage in the fishery for tuna and salmon in the Coos Bay area of Oregon. Notice of their application was published in the Federal Register, November 13, 1965.

Louis E. Wiegand, 3301 South Lake Drive, Miami, Fla., has applied for a loan to aid in financing the construction of a new 44-foot wood vessel to engage in the fishery for lobster, snapper, and grouper in the Florida area. Notice of the application was published in the Federal Register, November 17, 1965.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used ves-

sel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).

* * * * *

HEARING ON APPLICATION FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Pacific Trade Winds, Inc., 110 West Ocean Boulevard, Long Beach, Calif., has applied for a fishing vessel construction differential subsidy to aid in the construction of a 150-foot overall steel vessel to engage in the fishery for tuna. A hearing on the economic aspects of this application was held. The U. S. Bureau of Commercial Fisheries published the notice of the application and hearing in the Federal Register, November 17, 1965.



Eighty-Ninth Congress (First Session)



Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

SUPPLEMENTAL APPROPRIATIONS

1966: S. Rept. 912, Supplemental Appropriation Bill, 1966 (Oct. 19, 1965, report from the Committee on Appropriations, U. S. Senate, 89th Congress, 1st session, to accompany H. R. 11588), 72 pp., printed. Committee reported bill favorably with various amendments. The bill under the State Department includes \$500,000 for facilities for the International Pacific Halibut Commission; under the Interior Department, construction funds for Bureau of Sport Fisheries and Wildlife.

TRINITY RIVER AND TRIBUTARIES, TEXAS: H. Doc. 276, Trinity River and Tributaries, Texas: Letter from the Secretary of the Army, transmitting a letter from the Chief of Engineers, Department of the Army, Dated November 29, 1963, Submitting a Report, Together with Accompanying Papers and Illustrations, on a Review of the Reports on and a Survey of the Trinity River and Tributaries, Texas, made Pursuant to Several Congressional Authorizations Listed in the Report; in five volumes, volume V; referred to the Committee on Public Works, House of Representatives, 89th Congress, 1st session, Aug. 25, 1965, 276 pp., illus., printed. Volume V contains information on recreation and fish and wildlife; economic base study; comments of other agencies; and resolutions, public hearings, and prior reports. A small section discusses commercial fishing in the Trinity River area.



PRESIDENTIAL GREETING TO MEETING OF FISHERY ASSOCIATIONS

A highlight of the joint meeting June 20-23, 1965, in Miami Beach, Fla., of the Shrimp Association of the Americas and the Southeastern Fisheries Association was a telegram of greeting from President Lyndon B. Johnson. The telegram read as follows:

I EXTEND TO YOUR ASSOCIATIONS ASSEMBLED IN JOINT MEETING MY BEST WISHES FOR PRODUCTIVE AND SUCCESSFUL DISCUSSIONS. I AM ESPECIALLY PLEASED TO SEE THIS INTIMATE INTERNATIONAL COOPERATION BETWEEN ALL NORTH AND CENTRAL AMERICAN PRODUCERS OF THESE VERY IMPORTANT MARINE RESOURCES. YOUR PRODUCTS CONTRIBUTE SIGNIFICANTLY TO OUR NUTRITIONAL WELL-BEING AND TO WELCOME VARIETY IN OUR DIETS. THIS IS TRULY A SPLENDID EXAMPLE OF JOINT EFFORTS TO UTILIZE AND CONSERVE NATURAL RESOURCES AND REFLECTS THE BEST SPIRIT OF OUR INTERNATIONAL COOPERATION YEAR.

LYNDON B. JOHNSON



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
MNL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SEP - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR - FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number	Title
CFS-3872	- Virginia Landings, April 1965, 4 pp.
CFS-3888	- California Landings, May 1965, 4 pp.
CFS-3889	- Virginia Landings, May 1965, 4 pp.
CFS-3890	- Maryland Landings, June 1965, 4 pp.
CFS-3899	- Louisiana Landings, 1964 Annual Summary, 7 pp.
CFS-3900	- Frozen Fishery Products, August 1965, 8 pp.
CFS-3901	- Texas Landings, 1964 Annual Summary, 8 pp.
CFS-3902	- Imports of Fish Meal and Scrap, 1937-1964, H.S. No. 1 (Revised), 6 pp.
CFS-3903	- U. S. Fish Meal and Scrap Production, 1929-1964, H. S. No.2 (Revised), 4 pp.
CFS-3904	- Foreign Trade in Fish and Marine-Animal Oils, 1925-1964, H. S. No. 3 (Revised), 10 pp.
CFS-3905	- Menhaden Fishery, 1873-1964, H. S. No. 4, 7 pp.
CFS-3908	- Fish Meal and Oil, July 1965, 2 pp.
CFS-3909	- California Landings, June 1965, 4 pp.
CFS-3910	- South Atlantic Fisheries, 1964 Annual Summary, 9 pp.
CFS-3911	- Alabama Landings, July 1965, 3 pp.
CFS-3913	- Georgia Landings, June 1965, 2 pp.
CFS-3916	- Michigan, Ohio & Wisconsin Landings, June 1965, 4 pp.
CFS-3917	- Shrimp Landings, March 1965, 5 pp.
CFS-3918	- Gulf Coast Shrimp Data, March 1965, 15 pp.
CFS-3920	- Oregon Landings, 1964 Annual Summary, 2 pp.
CFS-3921	- Washington Landings, 1964 Annual Summary, 2 pp.
CFS-3924	- Mississippi Landings, June 1965, 3 pp.
CFS-3925	- Maine Landings, July 1965, 4 pp.
CFS-3927	- New York Landings, July 1965, 4 pp.
CFS-3928	- Louisiana Landings, July 1965, 3 pp.
CFS-3931	- Florida Landings, August 1965, 8 pp.

Wholesale Dealers in Fishery Products (Revised):

SL-25 - Wisconsin (Great Lakes Area), 1964, 2 pp.
SL-32 - Minnesota (Mississippi River and Tributaries), 1964, 1 p.
SL-34 - Wisconsin (Mississippi River and Tributaries), 1964, 2 pp.

Sep. No. 746 - A Japanese Gill-Net Fishery for Bottom-fish in the Gulf of Alaska.

Sep. No. 747 - Reduction Process to Convert Raw Fish into Thiaminase-Free Press Cake.

Sep. No. 748 - Technical Note No. 1--Rapid Field Method for Determining the Salt Concentration in Fresh and Smoked Chub.

FL-147 - List of National Fish Hatcheries, 11 pp., revised July 1965.

FL-190 - Turtle Trapping, 8 pp., illus., revised March 1965.

FL-579 - Castnets Constructed of Machine-Made Netting, by Hilton M. Floyd, 14 pp., illus., processed, June 1965.

FL-580 - Sea Lamprey, by Lola T. Dees, 10 pp., illus., Aug. 1965. Discusses the history of the sea lamprey invasion of the Great Lakes following the completion of the Welland Canal between Lakes Erie and Ontario in 1829; effect of lamprey attacks on the Great Lakes fishery; natural history--spawning, larval and adult lampreys; value of lampreys; their control; and restoring the lake trout after decimation by lampreys.

FL-585 - Fisheries Loans for Vessels and Gear, 14 pp., August 1965.

SSR-Fish. No. 505 - Spiny Lobster Explorations in the Pacific and Caribbean Waters of the Republic of Panama, by Johnny A. Butler and Norman L. Pease, 30 pp., illus., July 1965. An interagency agreement, signed in June 1962, between the U. S. Fish and Wildlife Service, Bureau of Commercial Fisheries, and the U. S. Agency for International Development resulted in a survey of the spiny lobster potential in Panamanian waters. Bureau staff members used the chartered 72-foot vessel Pelican. This report describes explorations in 1962 carried out in both Caribbean and Pacific waters with wood, reed, and wire traps. Wood traps proved most economical and successful. Bait for the traps (small, mixed

bottomfish) was obtained locally. Indications of commercial potential for a spiny lobster fishery were found. During 1963 work included simulated commercial fishing with traps and trawls. Excellent catches were made. In addition to spiny lobsters, sand lobsters and bay scallops were found in sufficient numbers to start a new Panamanian industry.

SSR-Fish. No. 517 - A Raft for Direct Subsurface Observation at Sea, by Reginald M. Gooding, 7 pp., illus., June 1965.

SSR-Fish. No. 518 - Industrial Bottomfish Fishery of the Northern Gulf of Mexico, 1959-63, by Charles M. Roithmayr, 27 pp., illus., Sept. 1965.

A Review of the Gulf of Mexico Red Snapper Fishery, by James S. Carpenter, Circular 208, 39 pp., illus., printed, Aug. 1965. Discusses the red snapper fishery and its development in the Gulf of Mexico. From a relatively small fleet of sail-powered schooners with live-wells for keeping fish, the vessels have now become a group of diesel powered boats using ice for preserving the catch. The fishing grounds have grown from areas lying close to the mainland (inside 40 fathoms) off Florida and the "middle grounds" southeast of Pensacola to the "western grounds" off Texas and the Campeche Banks off Mexico. Gear has developed from cotton hand lines using the hand-over-hand technique to stainless-steel lines with reels and improved terminal gear. Navigation has metamorphosed from dead-reckoning and sounding techniques to modern electronic equipment, complete and accurate charts, and celestial navigation. Gear has been improved from the generally ineffective cod gill nets, long lines, hoop nets, and fish traps to the highly successful modified otter trawls. Unsatisfactory fish-handling techniques, resulting in poor quality, have evolved into greatly improved methods. Marketing has changed from almost exclusive use of railroads for shipping fish iced in barrels to the predominant use of trucks for shipping boxes of iced fish.

Annual Report of the Bureau of Commercial Fisheries Radiobiological Laboratory, Beaufort, N.C., for the Fiscal Year Ending June 30, 1964, Circular 217, 37 pp., illus., June 1965. Presents details on accomplishments of the Radiobiological Laboratory in programs on estuarine ecology, pollution studies, and radiation effects. Also includes information on staff activities, new laboratory facilities, meetings attended by laboratory personnel, scientific papers presented, and staff publications.

Fishery Product Inspection, Circular 218, 12 pp., illus., printed, April 1965. Discusses the USDI voluntary inspection service; U. S. grade standards; the three types of inspection--continuous inspection, lot inspection, and unofficial sample inspection; how you can get USDI inspection service; and inspection fees.

Fish Go in Schools, by Bob Finley and Ann Davies, Circular No. 222, 16 pp., illus., printed. Discusses how fishery products have kept pace with innovations in convenience, and are excellent for use in school lunches. Variety is offered in the many species of shellfish and finfish on the market; the many market forms and ways in which they can be prepared. Further advantages are found in their economy, excellent nutritive value, and ease of preparation. Tips on baking fish are offered. The many market forms of fish, standards in selecting fresh fish, quality in

frozen fish, and thawing procedures are discussed. A section on how to arouse interest and awaken appetites covers use of imaginative planning, food education and acceptance, romance of science, posting of menus, coordination of nutrition classes with the school-lunch program, and visual communication.

Biological Laboratory, Galveston, Tex., Fishery Research for the Year Ending June 30, 1964, Circular 230, 113 pp., illus., Aug. 1965. Presents details on accomplishments of the Galveston Laboratory in programs on shrimp biology, shrimp dynamics, industrial fishery, estuarine ecology, and experimental biology. Also contains information on special reports on biological indicators in East Lagoon, Galveston Island, distribution of bottom sediments in Clear Lake, Tex., research on the molecular basis of brain function in fish, and description of salt-water laboratories; library and laboratory facilities; meetings attended by laboratory personnel; work conferences attended; publications by staff members; manuscripts in press and submitted.

The Fishery-Oceanography Center, La Jolla, California, edited by Robert I. Clutter and Glenn A. Flittner, Circular 232, 37 pp., illus., Oct. 1965. Describes briefly the facilities of the laboratory and research vessels operated in connection with the La Jolla Fishery-Oceanography Center. Provides information on accomplishments of the California Current Resources Laboratory conducting research on the California sardine--population dynamics, subpopulations, pelagic surveys, life history and taxonomy, physiology, behavior, and plankton dynamics. Discusses work of tuna resources laboratory--forecasting and oceanography, tuna behavior, temperate tuna biology, operations research, and contract research; Scripps tuna oceanography research; Inter-American Tropical Tuna Commission; and California's Marine Research Committee.

Fishery Management Services Annual Report for 1964, Resource Status Report 2, 53 pp., illus., June 1965.

Make Your Seafood Menus Sing--Perk 'Em Up with Pecans, Fisheries Marketing Bulletin, 6 pp., illus., printed. Introduces the use of pecans in fish cookery. Contains recipes for shrimp 'n' cranberry salad, tuna waldorf salad, salmon party log, crab salad in lime mold, and shrimp-cheese dreams.

THE FOLLOWING MARKET NEWS LEAFLETS ARE AVAILABLE FROM THE FISHERY MARKET NEWS SERVICE, U. S. BUREAU OF COMMERCIAL FISHERIES, RM. 510, 1815 N. FORT MYER DR., ARLINGTON, VA. 22209.

Number	Title
MNL-17	- The Italian Fishing Industry, 1964, 15 pp.
MNL-90	- Belgian Fishing Industry, 1964, 31 pp.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary, Part I--Fishery Products Production and Market Data, September 1965, 16 pp. (Market News Service, U.S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil and solubles; for the month indicated.

California Fishery Market News Monthly Summary,

Part II-Fishing Information, September 1965, 8 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

California Fishery Products and Byproducts Brokers, Importers, and Exporters, 1964, SP List I (Revised), 11 pp., Oct. 1965. (U. S. Bureau of Commercial Fisheries, Market News Service, Post Office Bldg., San Pedro, Calif. 90731.)

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, September 1965, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, oil, and solubles; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex.; and sponge sales; for the month indicated.

List of Primary Receivers of Imported Fishery Products and Byproducts, New Orleans, La., 1965, 4 pp., Sept. 30, 1965. (U. S. Bureau of Commercial Fisheries, Market News Service, 608 Federal Bldg., 600 South St., New Orleans, La. 70130.)

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, September 1965, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, 18 S. King St., Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, September 1965, 24 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, September 1965, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the hal-

ibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

THE FOLLOWING ENGLISH TRANSLATIONS OF FOREIGN LANGUAGE ARTICLES ARE AVAILABLE ONLY FROM THE ICHTHYOLOGICAL LABORATORY, BUREAU OF COMMERCIAL FISHERIES, U. S. NATIONAL MUSEUM, WASHINGTON, D. C. 20560.

The Composition of Species of the Genus CYCLOTHONE (Pisces, Gonostomidae) in the Pacific Ocean, by V. A. Mukhacheva, Translation No. 36, 51 pp., 1965. (Translated from the Russian, *Trudy Instituta Okeanologii, Akad. Nauk SSSR*, vol. 73, 1964, pp. 93-138.)

On the Life Colors of Some Fishes. XIII; Scientific Names of "Gingao-Iwashi," by Nagamichi Kuroda, Translation No. 37, 10 pp., 1965. (Translated from the Japanese, *Japanese Journal of Ichthyology*, vol. 8, nos. 5/6, June 30, 1962, pp. 122-125; *Zoological Magazine*, vol. 70, no. 3, March 15, 1951, pp. 98-101.)

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

Dolphins and Porpoises, Fisheries Center Leaflet 1, 8 pp., illus., printed, 1965, 5 cents. This is the first of a new series of leaflets to be published by the forthcoming National Fisheries Center and Aquarium. It describes dolphins and porpoises, smaller members of the suborder Odontoceti, or toothed whales. In spite of their strong resemblance to fish, they are warm-blooded, aquatic mammals, bearing their young alive and nursing them on milk as do more easily recognized mammals. Although much alike, dolphins and porpoises are frequently placed in different families by zoologists--chiefly on the basis of the form of the teeth and the presence of small bony protuberances on the forward edge of the dorsal fin. The structure, behavior, and reproduction of the two are described and compared. Short descriptions, accompanied by illustrative drawings, are given for the Atlantic bottlenose dolphin, spotted dolphin, spinner dolphin, common dolphin, Pacific whitesided dolphin, Amazon freshwater dolphin, pink freshwater dolphin, harbor porpoise, Burmeister porpoise, Dall porpoise, and finless black porpoise.

Marine Decapod Crustaceans of the Carolinas, by Austin B. Williams, Fishery Bulletin, vol. 65, no. 1, 1965, 309 pp., illus., printed, \$2.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ANCHOVY:

Considerations on the Sampling of Marine Fish. IV--Sampling of ANCHOVIELLA HUBBSI Hildebrand, by Hitoshi Nomura, Contribution No. 31, 6 pp., printed

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

in English with Portuguese summary. (Reprinted from *Revista Brasileira de Biologia*, vol. 24, no. 4, Dec. 1964, pp. 365-370.) Sociedade de Biologia de Brasil, Caixa Postal 1587, Rio de Janeiro, Brazil.

AQUATIC BIOLOGY:

"Floating classroom for aquatic biology," by H. Charles Laun, article, *Turtox News*, vol. 43, no. 5, 1965, pp. 130-133, illus., printed. General Biological Supply House, Inc., 8200 S. Hoyne Ave., Chicago, Ill.

ARAL SEA:

"O sokhraneni basseina Aral'skogo morya kak vazheishego istochnika tsennykh rybnnykh produktov" (On the preservation of the Aral Sea basin as a major source of valuable fish products), by L. S. Berdichevskii, article, *Rybnye Zapasy Aral'skogo Morya i Puti Ikh Ratsional'nogo Ispol'zovaniya* (Fish Resources of the Aral Sea and Ways of Their Rational Utilization), pp. 132-134, printed in Russian. Nauka, Tashkent, U.S.S.R.

ARGENTINA:

"La produccion Argentina de pescado en 1964" (Argentina's fishery production in 1964), by Carlos Taboas, article, *Industrias Pesqueras* (Statistics Annual for 1964), vol. 39, nos. 913-914, May 15, 1965, p. 208, printed in Spanish. Industrias Pesqueras, Apartado 35, Vigo, Spain.

Produccion Pesquera Argentina, 1964 (Argentina's Fishery Production, 1964), 114 pp., illus., processed in Spanish. Departamento de Investigaciones Pesqueras, Direccion General de Pesca, Secretaria de Estado de Agricultura Ganaderia, Brasil y Florencio Sanchez, Buenos Aires, Argentina. Presents a brief summary of the Fisheries of Argentina in 1964--landings totalling 160,306 metric tons, production of processed products, development of fishery resources, increase of per capita fish consumption, production of 11,852.2 tons of fish meal, increase in number of fishing vessels, principal fishing ports, installation of processing plants, distribution of fishery products by refrigerated trucks, production of fresh-water fisheries, and foreign trade in fishery products. Most of the report is devoted to statistical tables showing quantity and value of fishery landings, 1935-64; quantity and value of processed products, 1964; marine fishery production by species and by months and ports; high-seas fishery production by species and ports; coastal fishery production by ports and by species and months; fresh-water fishery production by areas and months; production of processed fishery products and byproducts; and foreign trade in fishery products.

AUSTRALIA:

Additions to the Fish Fauna of Western Australia, by G. F. Mees, *Fisheries Bulletin* No. 9, pt. 4, printed, 1964. Western Australia Fisheries Department, Perth, Australia.

Guide to Fishes (Queensland), by E. M. Grant, *Fisheries Notes*, vol. 2, no. 2, 1965, 288 pp., illus., printed. Department of Harbours & Marine, Edward St., Box 509H, G.P.O., Brisbane, Australia. This book contains a representative selection of the fish and crustaceans (including those used for bait) most commonly encountered by fishermen along the Queensland coast. The book is an aid to anglers and com-

mercial fishermen in the visual identification of principal species. It provides general information on habits, coloration, catchability. It helps the amateur naturalist in distinguishing between related species and gives a taxonomic description for the scientific worker. Chapters cover the sharks and rays, marine fish (general), fresh-water fish, poisonous fish, and crustaceans. Also included are an index of common names and an index of scientific names, an adequate bibliography, and descriptions of crustaceans. Each page describing a fish bears the best available illustration of the principal fish described, and details the more easily discernible points of dissimilarity from other and related species. Although intended primarily for biology students, the book will interest both commercial and sport fishermen, as well as amateur naturalists.

BACTERIOLOGY:

Der Phenolgehalt des Wassers in Seiner Auswirkung auf den Fischorganismus (The Phenol Content of Water and Its Effect on Fish Organisms), by H. H. Reichenbach-Klinke, 16 pp., illus., printed in German with English summary. (Reprinted from *Archiv fur Fischereiwissenschaft*, vol. 16, no. 1, July 1965, pp. 1-16.) Bundesforschungsanstalt fur Fischerei, Palm-alle 9, Hamburg-Altona 1, Federal Republic of Germany.

BARENTS SEA:

"New data on the northern limit of occurrence of young cod, haddock, Norway haddock, and herring in the Barents Sea," by T. S. Berger, B. A. Popov, and R. A. Cheremisina, article, *Dokl. Akad. Nauk SSSR Biol. Sci. Sect.*, vol. 143, no. 176, 1962, printed in Russian. Akademiia Nauk SSSR, Podmosenski per. 21, Moscow B-64, U.S.S.R.

BENTHIC FISH:

A Photographic Survey of Benthic Fishes in the Red Sea and Gulf of Aden, with Observations on Their Population Density, Diversity, and Habits, by N. B. Marshall and D. W. Bourne, *Bulletin* vol. 132, no. 2, 244 pp., 1964, illus., printed. Harvard University, Museum of Comparative Zoology, Cambridge, Mass.

BERING SEA:

"Khimicheskaya kharakteristika zheltoperoi kambaly, treski i mintaya yugo-vostochnoi chasti Beringova morya" (Chemical composition of yellowfin sole, cod and walleye pollock of the southeastern Bering Sea), by M. N. Krivobok and O. I. Tarkavskaya, article, *Trudy Vses. Nauch. Issled. Inst. Morsk. Rybn. Khoz. Okeanogr.*, vol. 49, 1964, pp. 257-272, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

BILLFISH:

Distribution and Relative Abundance of Billfishes (Is-tiophoridae) of the Pacific Ocean, by John K. Howard and Shoji Ueyanagi, *Studies in Tropical Oceanography* No. 2, 144 pp., illus., printed, July 1965, \$5.50. Publications Department, Institute of Marine Science, 1 Rickenbacker Causeway, Miami, Fla. 33149.

BIOLOGICAL SPECIMENS:

A Method for Preserving Color in Biological Specimens, by Richard A. Waller and William N. Eschmeyer, 1 p., printed. (Reprinted from *BioScience*, vol. 15, no. 5, 1965, p. 361.) American Institute of Biological Sciences, 2000 P St. NW., Washington, D. C.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

BRAZIL:

Peixes Marinhos (Marine Fish), by Hitoshi Nomura and N. Menezes, 43 pp.; printed in Portuguese. (Reprinted from Historia Natural dos Organismos Aquaticos do Brasil (Natural History of Aquatic Organisms of Brazil), 1964, pp. 343-485. Instituto Oceanográfico, Universidade de São Paulo, São Paulo, Brazil.

CANADA:

Journal of the Fisheries Research Board of Canada, vol. 22, no. 5, Sept. 1965, 216 pp., illus., printed, single copy C\$2. The Queen's Printer, Ottawa, Canada. Some of the articles are: "Fatty acids derived from lipids of marine origin," by P. M. Williams; "Paralytic shellfish poison in sea scallops (Placopecten magellanicus, Gmelin)," by N. Bourne; and "Fluctuations in the success of year-classes of whitefish populations with special reference to Lake Erie," by G. H. Lawler.

CASPIAN SEA:

"Okhrana zapasov tsennykh promyslovykh ryb Kaspiskogo basseina" (Protection of the stock of economically valuable fish of the Caspian basin), by L. S. Berdichevskiy, article, Priroda, vol. 10, 1958, pp. 51-54, printed in Russian. Akademiia Nauk SSSR, M. Khariton'yevskiy per. 4, Moscow, U.S.S.R.

CIGUATERA:

"Countering a fish poison," by Howard Simons, article, New Scientist, vol. 27, no. 461, Sept. 16, 1965, p. 680, printed, single copy 1s.3d. (about US\$0.20). Cromwell House, Fulwood Pl., High Holborn, London WC1, England.

CLAMS:

Articles from Biological Bulletin, illus., printed, single copy \$3.75. Marine Biological Laboratory, Woods Hole, Mass.:

"Chromosomes of two species of quahog clams and their hybrids," by R. Winston Menzel and Margaret Y. Menzel. vol. 129, no. 1, Aug. 1965, pp. 181-188.

"Reproductive cycle of Mya arenaria in New England," by John W. Ropes and Alden P. Stickney, vol. 128, no. 2, 1965, pp. 315, 327.

Development of a Hydraulic Pressure Dredge for Harvesting Clams, Research Development Bulletin No. 15, 4 pp., illus., processed, Sept. 1965. White Fish Authority, 2/3 Cursitor St., London EC4, England. In September 1964, a commercial shellfish operator in the United Kingdom took delivery of a Dutch hydraulic dredge designed for cockle harvesting, and the White Fish Authority took the opportunity to carry out trials with this equipment on a bed of clams. The trials were highly successful, though it was recognized that modifications to the gear could most likely improve its efficiency on clams. A new dredge was built for the Authority and this gear incorporated the proposed modifications. The principle of hydraulic dredging is, basically, that powerful jets of water are directed to the bottom within which species to be caught are recessed. A dredge blade follows the water jet and both blade and jet combine in a loosening-excavating operation and the animals are taken in a following bag.

Large Quahog Clams from Boca Ciega Bay, by Harold W. Sims, Jr., Contribution No. 84, 1 p., printed, 1964. Marine Laboratory, Florida State Board of Conservation, Bayboro Harbor, St. Petersburg, Fla.

Washington Razor Clams; Regulations, 7 pp., illus., printed, 1965. Washington State Department of Fisheries, Rm. 115, General Administration Bldg., Olympia, Wash.

COD:

"Essais de pêche pélagique de la morue au Labrador" (Pelagic fishing explorations for cod off Labrador), by C. Nedelec, article, France Pêche, no. 98, Sept. 1965, pp. 36-38, illus., printed in French, single copy 2.5 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France.

COD AND HADDOCK:

"Beskatningen av torsk- og hysebøstanden in vare nordlige farvann" (Assessment of the cod and haddock stock in our northern waters), by Arvid Hylen, article, Fiskets Gang, vol. 51, no. 37, Sept. 16, 1965, pp. 539-543, illus., printed in Norwegian. Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

COLORADO:

Research in Colorado: Report 1, edited by Richard W. Gregory and W. C. Nelson, 1 vol., illus., printed, 1964. Fisheries Research Division, Colorado Game, Fish, and Parks Department, Fort Collins, Colo.

CONSERVATION:

Compilation of Federal Laws Relating to the Conservation and Development of Our Nation's Fish and Wildlife Resources, compiled under the direction of Warren G. Magnuson, Chairman, Committee on Commerce, U. S. Senate, 486 pp., printed, 1965, \$1.50. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Contains sections on Federal laws on fish and wildlife, general; fish and fisheries; wildlife; water resource statutes relating to fish and wildlife; and other laws relating to fish and wildlife. Some of the laws outlined under the part on fish and fisheries are: Federal aid programs relating to the sport and commercial fishing; fishing vessel construction differential subsidy program; prohibitions and penalties relating to fishing by foreign-flag vessels; United States fishing vessels; fishermen's cooperative associations; medical care for seamen; fishery educational authorities; surplus fishery products; laws implementing international agreements or conventions; and interstate compacts. Other laws relating to fisheries are: authorities relating to specific fish hatcheries and to other facilities; authorities relating to fishery research, studies, and propagation; prohibitions regarding certain fisheries; proclamation on coastal fisheries in certain areas of the high seas; executive order on fishery conservation zones; dogfish shark eradication; management of seals in Alaska; vessels of the Fish and Wildlife Service, and Coast Guard; fishery attaché program; loans to farmers, including fish farmers; and authority for a National Fisheries Center and Aquarium.

CRABS:

"Regulations and the market crab fishery," by Richard Poole and Dan Gotshall, article, Outdoor California,

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vol. 26, no. 9, Sept. 1965, pp. 7-8, illus., printed. State of California, Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.

CRUSTACEANS:

Biologiya Massovykh i Naibolee Obychnykh Vidov Rakobraznykh Barentseva i Belogo Morei (The Biology of the Most Abundant and Common Species of Crustaceans of the Barents and White Seas), by V. V. Kuznetsov, 242 pp., illus., printed in Russian, 1964, 1 Ruble 49 Kop. (about US\$1.65). Nauka, Moscow, U.S.S.R.

DANGEROUS FISH:

Poisonous and Dangerous Fish, USSR, by Yevgeniy Sergeyevich Prosvirov, TT: 65-31806, 66 pp., illus., processed, July 29, 1965, \$3. Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151.

DENMARK:

"Lovforslag om regulering av fiske-eksporten fra Danmark" (Legislative bill on regulation of fish exportation from Denmark), article, Tidsskrift for Hermetikindustri (Norwegian Cannery Export Journal), vol. 51, no. 7, July 1965, pp. 272-273, printed in Norwegian. De Norske Hermetikfabrikers Landsforening, Stavanger, Norway.

DICTIONARIES:

New Marine and Fisheries Dictionary - Nuevo Diccionario de Pesca y Marina, Spanish-English - English-Spanish, printed in Spanish and English, to be published soon, \$10. Fernando Flores Ltd., 705 N. Windsor Blvd., Los Angeles, Calif. 90038. This forthcoming English-Spanish, Spanish-English dictionary of marine and fisheries terms will be the first of its kind. It will contain complete terminology of commercial fisheries, the entire field of naval terminology, shore and ships, marine gear, fishing gear, names of commercial fish, shore plant terminology, ichthyology, and marine biology. It will be a pertinent, up-to-date, and practical reference book for sailors, merchant seamen, shipbuilders, ichthyologists, marine industrialists and, most of all, fishermen. Only those terms will be included which are of salient importance, of current usage, and which may be indispensable to anyone who fishes for pleasure or profit or writes about the sea and fishing.

DOLPHIN:

"El sonar de los cetáceos" (The sonar of the cetaceans), by Andres Munoz, article, Iberica, vol. 43, no. 36, June 1965, pp. 219-222, illus., printed in Spanish, 18 ptas. (about US\$0.30). Iberica, Palau, 3, Apartado 759, Barcelona-2, Spain.

DRYING:

Food Dehydration. Volume II--Products and Technology, edited by Wallace B. Van Arsdell and Michael J. Copley, 732 pp., illus., printed, 1964, domestic \$23.50, foreign \$24.50. The Avi Publishing Co., Inc., P. O. Box 238, Westport, Conn. This volume is organized into two major sections. The first deals broadly with food dehydration principles and practice applicable generally to all food commodities or a large group of them; the second handles the specific science and technology of individual dehydrated food commodities. This second group is itself organized

into two great divisions: first, the world of plant products, and second, that of animal products. Foods are dried or dehydrated for one or both of the following purposes: to preserve a perishable raw food commodity against deterioration or spoilage under the intended conditions of storage and eventual use; to reduce the cost or difficulty of packaging, handling, storing, and transporting the material by converting it to a dry solid, thus reducing its weight and also, usually but not necessarily, its volume. The intangible quality of convenience may also be served. The introductory chapter is devoted to a simplified statement of the principles of drying. In the second chapter, emphasis is placed on the fact that the "best" drying method for a food product is determined by quality requirements, raw material characteristics, and economic factors. A chapter on dehydration plant operations is devoted to raw material procurement, plant location, plant layout and construction, raw material preparation, finished product handling, and general business considerations. There follow chapters discussing procedures for dehydrating vegetables, potatoes, coffee and tea, dry soups and other dry mixes, fruits, fruit and vegetable juices, dry milk products, and eggs. A chapter on drying of meat, poultry, and fishery products considers the nature of the raw material--structure, physical properties, and chemical composition; effects of physical treatments--heat and denaturation, freezing and thawing; dehydration--drying in the thawed state, and freeze-drying; rehydration; deterioration in freeze-dried meat and fish during storage--reactions involved, and effects of external factors; nutritive value of dehydrated meats; and applied aspects--production of air-dried meat during World War II, developments other than freeze-drying, and freeze-drying of meat. Appendixes contain charts showing moisture contents of various foods, and expected ratios of fresh to dried weights; glossary of some of the technical terms used; and peroxidase test procedure to indicate adequacy of blanching. Each chapter is followed by its own bibliography and a complete index is placed at the end of the volume. The book will be of vital interest to food researchers as well as food processors, distributors, and retailers. Volume I published in 1963 presented a brief history of the food dehydration industry, some data on its growth and present importance in the United States, and a concise statement of scientific principles upon which this food preservation technology is based.

EAST AFRICA:

East African Freshwater Fisheries Research Organization, Annual Report, 1964, 75 pp., illus., printed, 1965, 6s. (about US\$0.85). East African Freshwater Fisheries Research Organization, P. O. Box 343, Jinja, Uganda. Describes the scientific work accomplished during 1964 in the study of the Lake Victoria fisheries; the Nile perch in Lake Victoria; ecology and productivity, especially of young Tilapia; fishery surveys in Kenya and Tanzania; anadromous fish; and mormyrid fish. Also includes a bibliography of recent publications on East African fisheries and related subjects; and appendices of research papers on fisheries.

EAST GERMANY:

"Die fischerei an der Afrikanischen Kuste" (The fishery off the African Coast), article, Fischerei-Forschung, vol. 3, no. 1, 1965, 140 pp., illus., printed in

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German. Institut für Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, German Democratic Republic.

"Jahresfischereibericht, 1963" (Annual fisheries report, 1963), article, Fischerei-Forschung, vol. 2, no. 2, 1964, pp. 1-166, illus., printed in German. Institut für Hochseefischerei und Fischverarbeitung, Rostock-Marienehe, German Democratic Republic.

EXPORTS:

Commercial Exports under A.I.D. Programs, 48 pp., illus., printed, 1965. Office of Material Resources, Agency for International Development, U. S. Department of State, Washington, D. C. 20523. A simple non-technical booklet describing how businessmen in the United States can participate in the export sales opportunities generated by A.I.D.-financed programs of commodity procurement. A.I.D. is not a purchaser of commodities, except in a very few instances, and thus should be regarded only as a financier. The purchasers are foreign businessmen/importers, foreign governments, general contractors for A.I.D.-financed projects, and other U. S. Government Agencies who purchase for A.I.D. The booklet answers the questions: How can you learn of opportunities for A.I.D.-financed business? What are the procedures governing A.I.D. sales? What A.I.D. requirements must be met as you fill the order? How does A.I.D. help to deliver the commodities? How do you get paid under A.I.D. financing? and explains other ways A.I.D. can help you.

FISH COOKERY:

"Delicacies from Louisiana waters," article Louisiana Conservationist, vol. 17, nos. 9 & 10, Sept.-Oct. 1965, pp. 12-13, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130. Presents cook-out recipes for charcoal-grilled red snapper steaks, flounder 'n foil with crab stuffing, and fried yellow perch fillets.

FISH DISEASES:

Fischkrankheiten in Bayern im Jahre 1964 (Fish Diseases in Bavaria in 1964), by H. Reichenbach-Klinke, 2 pp., illus., printed in German. (Reprinted from Allgemeine Fischerei-Zeitung, vol. 90, no. 4, 1965.) Landesfischereiverband Bayern e.V., 5 Kaiser Ludwigs Platz, Munich 15, Federal Republic of Germany.

FISHERMEN:

Anatomy of a Fisherman, by John Donaldson Voelker, 117 pp., illus., printed, 1964. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York, N. Y. 10018.

FISH MEAL:

Articles from Poultry Science, vol. 44, no. 2, March 1965, printed. Poultry Science Association, Kansas State University, Manhattan, Kans.:

"Biological evaluation of fish meal proteins as sources of amino acids for the growing chick," by R. E. Smith and H. M. Scott, pp. 394-400.

"Measurement of the amino acid content of fish meal proteins by chick growth assay," by R. E. Smith and H. M. Scott, pp. 401-413.

The Effect of Antioxidant Treatment on the Metabolizable Energy and Protein Value of Herring Meal, by

B. E. March and others, 7 pp., printed. (Reprinted from Poultry Science, vol. 44, no. 3, May 1965, pp. 679-685.) Poultry Science Association, Kansas State University, Manhattan, Kans.

"To compare the growth rate in chicks by using meat meal as a substitute for fish meal in chick starter ration," by O. P. Agarwala and G. P. Agarwala, article, Indian Poultry Gazette, vol. 48, no. 3, Oct. 1964, pp. 82-85, printed. Indian Veterinary Research Institute, Izatnagar, Up. India.

"Fish meal and yeast in poultry feed," by U. P. Kralovanszky and G. M. Szelenyi, article, Baromfitenyészet, vol. 9, no. 4, Apr. 1965, pp. 6-7, printed. Baromfitenyészet, Posta Központi Hírlap Iroda József Nádor, Ter. 1, Budapest 5, Hungary.

"New development in small fish meal plants for trawlers and shore installations," article, Norwegian Fishing and Maritime News, vol. 12, no. 1, 1965, pp. 15, 45, printed. Norwegian Fishing and Maritime News, P. O. Box 740, Slottsgt. 3, Bergen, Norway.

FISH OIL:

"Aceite de pescado repunta mundialmente" (Fish oil begins to appear worldwide), article, Pesca, vol. 10, no. 4, April 1965, pp. 18-20, illus., printed in Spanish with English summary, single copy \$1. Pesca, Av. Wilson 911, Oficina 301, Apartado 877, Lima, Peru.

FISH PRODUCTS:

"Research on fish products outlined," by Roger Berglund, article, Feedstuffs, vol. 37, March 27, 1965, pp. 8, 64, printed. Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis, Minn. This article covers 3 topics. The first is "Fish meal in turkey feeds." A comparison of the amino-acid composition of turkey rations composed mainly of corn and soybean meal with the amino-acid requirements of the turkey showed that these rations were deficient in certain amino acids, particularly methionine. Supplementing turkey diets with fish meal has several advantages. The fish meal provides (1) a desirable level of energy without fat supplementation; (2) an excellent balance of amino acids without special supplementation; and (3) the available phosphorus required, with a minimum of supplementary dicalcium phosphate. The second of the topics is "Unidentified growth factors in fish products or in fish solubles." From research work the conclusions were: (1) a growth factor did exist, (2) it was not a known vitamin, (3) it was not an essential amino acid, (4) it was not part of the ash, (5) there was more than one form, and (6) it might contain nitrogen. The final topic is "Fish meal in broiler feeds." Broiler body weight and tibia-ash data indicated that phosphorus from fish meal, poultry byproduct meal, and meat and bone meal were equally as available as was phosphorus from feed grade dicalcium phosphate or reagent sodium phosphate.

FISH PROTEIN CONCENTRATE:

"Factors influencing the nutritional value of fish flour. IV--Reaction between 1,2-dichloroethane and protein; V--Toxic material in samples extracted with 1,2-dichloroethane," by A. B. Morrison, M. Licsik, and I. C. Munro, article, Federation Proceedings, vol. 23, no. 4, part 1, 1964, p. 877, printed. Federation Proceedings of American Society for Experimental Bi-

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ology, 9650 Wisconsin Avenue NW., Washington, D. C. 20014.

FISH PUMP:

"New trend to boat pumps for shoal fish fleet," article, The South African Shipping News and Fishing Industry Review, vol. 20, no. 8, Aug. 1965, pp. 83,85,87, illus., printed, single copy 30¢ (about US\$0.45). Thomson Newspapers, South Africa (Pty.) Ltd., 8th Fl., Trust House, Thibault Sq., Box 80, Cape Town, Republic of South Africa.

FISH WASHER:

Fish-Washer Development, Research & Development Bulletin No. 14, 2 pp., illus., processed, Sept. 1965. White Fish Authority, 2/3 Cursitor St., London EC4, England. With the cooperation of a fishing firm, the Industrial Development Unit of the White Fish Authority has developed a fish-washer for use on board trawlers operating from the Port of Granton, England. Those vessels traditionally box the catch at sea, and all gutting and sorting are done in the deck ponds prior to washing. The Granton method requires the deck-sorted fish to be washed and transferred below as units of a single species. The new washer consists of a rectangular tank containing two nylon-covered wire baskets. Down the long sides of the tank are two perforated spray tubes, so arranged that the jets of water play onto the baskets. The cross-section of the tank is such that with the surging of water in the tank, due to ship motion, a sluicing action is given to the mass of water. Spill ports are cut out on the opposite side of the tank to that of the spray pipes; these serve to drain off dirty water and control the level. The method of operation is to tip small baskets of sorted and graded fish into one of the washer baskets and allow the surging and spray action to wash the fish. The baskets are oversized to allow the fish freedom of movement. After washing, the fish are tipped into a second small basket for handling into the fishroom.

FLOUNDER:

Flounders and Their Cousins, Unique Fish, by C. M. C. M. Bearden, Education Release 177, 5 pp., illus., printed. (Reprinted from South Carolina Wildlife, winter 1960.) Division of Information and Education, South Carolina Wildlife Resources Department, Box 360, Columbia, S. C.

"The yellow-finned flounder in the Eastern Bering Sea," by N. S. Fadeev, article, Trudy Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, vol. 48, 1963, pp. 281-291, printed in Russian. Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, Moscow, U.S.S.R.

FOOD:

Symposium on Foods: Proteins and Their Reactions (The Third in a series of Symposia on Foods Held at Oregon State University), edited by H. W. Schultz and A. F. Anglemier, 482 pp., illus., printed, 1964, domestic \$3, foreign \$3.50. The Avi Publishing Co., Inc., P. O. Box 388, Westport Conn. Presents papers by 18 food scientists, grouped into five sections. The introductory section contains "Personal perspectives in the practice of protein chemistry," by R. David Cole. The section on structure and properties of proteins

offers: "The structure of proteins," by Richard T. Jones; "Apolar interactions in polypeptidyl proteins," by R. R. Becker; and "Denaturation: a requiem," by J. Ross Colvin. Next is a section on protein interaction and degradation containing: "Protein-protein interaction: endothermic polymerization and biological processes," by Max A. Lauffer; "Protein-lipid complexes," by D. G. Cornwell and L. A. Horrocks; "Protein-carbohydrate complexes," by F. R. Jevons; and "Some recent advances in techniques for protein degradation," by Joe R. Kimmel. A section on major protein systems and factors affecting them includes: "The nature of interactions in proteins derived from milk," by Sege N. Nimasheff; "Egg proteins," by Robert E. Feeney; "Meat proteins," by J. R. Bendall; "Fish muscle proteins and some effects on them of processing," by J. J. Connell; "Seed proteins," by Aaron M. Altschul; and "Cereal proteins," by J. S. Wall. The final section on biological effects of protein interactions contains: "The evolution of proteins," by Robert E. Feeney; "Some aspects of the nutritive value of proteins," by A. B. Morrison; "Metabolic antagonists," by William Shive; "Food allergens," by Margaret B. Strauss; "Immuno Chemistry," by Frank Perlman; and a summary of the Symposium-panel discussion. Each paper includes a record of discussion and a complete bibliography. An adequate index concludes the book. Although written in technical phraseology, the book will be useful to anyone in food retailing or wholesaling, and institutional feeding, as well as to those studying or researching food chemistry or technology. It is an authoritative up-to-date reference on proteins and their reactions. The chapter on fish proteins discusses deterioration during frozen storage, changes due to processing, effects of freeze-drying, effects of frozen storage, effects of species variation, and effects of storage near 0° C. (32° F.).

FOOD AND AGRICULTURE ORGANIZATION:

Interession Report (1962-1964) of Technical Committee I Submitted to the 11th Session of the IPFC, Occasional Paper 65/3, 204 pp., illus., processed, 1965. Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Bangkok, Thailand. The first part is a summary report of the activities in fishery biology, oceanography, and limnology of member countries of the Indo-Pacific Fisheries Council (IPFC), and of the Food and Agriculture Organization of the United Nations (FAO) during the Interession period of 1962-64 as compiled by Technical Committee I. The second part is a report on the responses during the Interession period, 1962-64, to recommendations made by the 10th Session of the IPFC regarding work of Technical Committee I or to subjects within its field. The final part is a report of the FAO for the IPFC Interession period 1962-64 on activities relating to the work program of Technical Committee I, IPFC. Appendices include report on unit fisheries as objects of study in fisheries science, the Australian unit fisheries, unit fisheries of the Philippines, computer programs in use for fishery and oceanography purposes, project summaries for Australia, IPFC proposed format for project summaries, and Pacific Ocean data summary charts.

The following revisions, processed in Spanish, to Directorio de Servicios e Instituciones de Pesca en América Latina (Directory of Fishery Services and Institu-

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tions in Latin America) (vol. 1) are available from the Regional Office for Latin America, Food and Agriculture Organization of the United Nations, Casilla 10095, Santiago, Chile:

Informacion No. 1 para Actualizar el Directorio de Servicios e Instituciones de Pesca en America Latina (Volumen 1) (Information No. 1 to Revise the Directory of Fishery Services and Institutions in Latin America, Vol. 1), 10 pp., July 1965.

Informacion No. 2 (Information No. 2), 1 p., Sept. 1965.

Nomina de Instituciones y Servicios Consignados, Servicios Gubernamentales de Administracion Pesquera--Argentina (List of Institutions and Assigned Services, Government Services for Fishery Administration--Argentina), 14 pp., July 1965.

Grupo Coordenar do Desenvolvimento da Pesca--Superintendencia do Desenvolvimento do Nordeste--Sudene--Brazil (Coordinated Group for Development of Fishery--Superintendency of Development of the Northeast--Sudene--Brazil), 4 pp., May 1965.

Instituto de Fomento Pesquero--Chile (Institute for Fishery Development--Chile), 12 pp., Aug. 1965.

Departamento Cientifico y Tecnico del Servicio Oceanografico y de Pesca--Uruguay (Scientific and Technical Department for the Fishery and Oceanography Service--Uruguay), 11 pp., Apr. 1965.

FOOD FOR PEACE:

Food for Peace--1964 Annual Report on Public Law 480, 155 pp., illus., printed, 1965, \$1. U. S. House of Representatives, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Includes a short report on the fishery research programs of the Bureau of Commercial Fisheries using foreign currencies under "Food for Peace" (Public Law 480, 83rd Congress). During calendar year 1964, \$212,753 foreign currencies were obligated for the purpose bringing to \$548,220 the total obligated since the beginning of the program in fiscal year 1962. The bulk of the currencies was for use in India, Israel, and Poland.

FRANCE:

"En 1964 la pêche française a franchi un nouveau seuil en mettant à terre plus de 400,000 t de poisson frais et congelé" (In 1964 the French fishery has jumped to a new record in landing more than 400,000 metric tons of fresh and frozen fish), article, La Pêche Maritime, vol. 44, no. 1049, Aug. 1965, pp. 605-611, printed in French, single copy 15 F. (about US\$3.05), Les Editions Maritimes, 190, Blvd. Haussman, Paris, France.

FREEZER TRAWLERS:

"Freezing trawlers for tropical countries," by G. Gianesi, article, Annex 1964-3, Bulletin, International Institute of Refrigeration, pp. 189-193, printed, Institut International du Froid, 177, Blvd. Malesherbes, Paris (17^e), France.

FREEZING ON BOARD:

"Fish freezing at sea," by K. A. Oettle, article, Food Industries of South Africa, vol. 17, no. 5, Sept.-Oct. 1964, pp. 51-53, illus., printed, Odhams Press, 16 Bree St., P. O. Box 4245, Cape Town, Republic of South Africa.

"Vertical plate freezer prepares quick-frozen at sea," by A. Muir, article, Canadian Refrigeration and Air Conditioning Journal, vol. 30, no. 6, June 1964, pp. 22-23, illus., printed, National Business Publications Ltd., Gardenvale, Quebec, Canada.

FRESH FISH:

(White Fish Authority Conference) The Handling and Care of Fish at Sea--Papers and Discussions at a Conference Held at Olympia, London, May 31-June 2, 1965, 88 pp., illus., printed, July 1965. Fishing News Ltd., 110 Fleet St., London EC4, England. Contains articles and pertinent discussions on: "Handling, stowage and discharge of catch," by J. J. Waterman; "Supplementary paper," by W. G. F. Carnie; "The chilling of fish on board fishing vessels," by John H. Merritt; "Chilling methods on board (supplementary paper)," by S. Forbes Pearson; and "Antibiotic ice: the advantages (supplementary paper)," by A. P. Hudson. Remaining articles are on: "Freezing trawlers and their equipment," by S. Forbes Pearson; "Supplementary paper," by M. B. F. Ranken; "Freezing fillets at sea," by N. R. Jones; "Offal processing," by S. W. F. Hanson; "Economic size of mother factoryships and catchers," by C. Birkhoff; and "Freezing fillets," by J. J. Diestel. The final section is devoted to short articles on new gear and vessels, such as a slice-ice plant, stern trawlers, ice making machines, a dielectric heating plant for thawing of sea frozen fish, buoys and floats, fish-processing machinery, synthetic fibers for fishing, and plastic containers.

FROZEN FISH:

"Studies on 'spongy meat' formation of frozen cod and Alaska pollock," by T. Tanaka, article, Refrigeration, vol. 40, no. 447, Jan. 1965, pp. 3-13, illus., printed in Japanese. Nihon Reito Kyokai, No. 3, 1-chome, Ginza Nishi, Chuo-ku, Tokyo, Japan.

FUR SEALS:

"Harvesting the stocks of fur seals," by S. V. Dorofeev, article, Zoologicheskii Zhurnal, vol. 42, no. 7, 1963, pp. 1,111-1,113, printed in Russian. Redaktsiia Zoologicheskogo Zhurnala, Podmoskvijskii per. d. 21, Moscow B-64, U.S.S.R.

GERMAN FEDERAL REPUBLIC:

Selling in Germany, by Robert E. Day, Jr., OBR 65-64, 20 pp., illus., printed, Aug. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

GREECE:

Selling in Greece: Government Procurement Procedures, OBR 65-66, 8 pp., printed, Sept. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

HAWAII:

Proceedings, Governor's Conference on Science and Technology, State of Hawaii, January 26-30, 1965, 183 pp., processed, May 1965. Department of Planning and Economic Development, State of Hawaii, 426 Queen St., Honolulu 13, Hawaii. Purposes of the Conference were: to describe the national and world developments of science and technology, their future impact, and the consequent need for professional, technical, and industrial skills; to describe the present state of the art and probable future direction of selected scientific areas which might have special significance to Hawaii; to emphasize the critical role which the utilization and expansion of Hawaii's science resources can play in the economic growth of the State; and to suggest an action program, and the role of government, industry, and the University of Hawaii in its achievement. Included among many other articles are: "Frontiers of ocean engineering from an industry viewpoint," by Carl H. Holm; "Oceanographic instrumentation and Hawaiian fisheries," by John C. Marr; "Man in the sea program for Hawaii," by Taylor Pryor; "Man in an alien environment," by William Helvey; and "The art of making money in the ocean," by Willard Bascom.

HERRING:

"Biology of White Sea herring fry," by M. N. Konstantinova, article, Trudy Kandalakshkogo Gosudarstvennogo Zapovednika, vol. 4, 1963, pp. 243-245, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

"Some peculiarities in the behavior of herring in a uniform electric field of continuous and pulsating current," by G. B. Daniyulite, article, Trudy Akademii Nauk Lit. S.S.R., Ser. B, vol. 3, no. 32, 1963, pp. 181-194, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

ICELAND:

"Hagnting fiskafans 1964" (Utilization of the fish catches 1964), article, Aegir, vol. 58, no. 12, July 1, 1965, pp. 211-216, printed in Icelandic. Fiskifelag Islands, Reykjavik, Iceland.

ICHTHYOLOGY:

Station Data Errors for Fishes Collected by the Steamer "Blake," by William N. Eschmeyer, 3 pp., illus., printed. (Reprinted from Copeia, no. 2, June 25, 1965, pp. 236-238.) American Society of Ichthyologists and Herpetologists, 18111 Nordhoff St., Northridge, Calif.

IDAHO:

Available from Idaho Fish and Game Dept., 518 Front St., Boise, Idaho:

Federal Aid to Fish Restoration Annual Progress Report for Investigations Project F-49-R-1 (1962), Salmon and Steelhead Investigations, 100 pp., illus., printed, 1965.

Federal Aid to Fish Restoration Job Completion Report for Project F-32-R-6, Tests for Increasing the Returns of Hatchery Trout, February 1, 1963, to February 1, 1964, by Osborne Casey and others, 33 pp., illus., printed, 1965.

INDUSTRIAL PRODUCTS:

"An improved method of processing fish and fish offal," by D. G. Gillies, article, Food Manufacture, vol. 39, June 1964, p. 35, printed. Gramplan Press, Ltd., The Tower, Shepherds Bush Rd., Hammersmith, London W6, England.

INTERIOR DEPARTMENT:

United States Department of the Interior--Organization and Functions, 31 pp., printed, 1965. (Reprinted from the United States Government Organization Manual, 1965-66.) U. S. Department of the Interior, Washington, D. C. 20240.

ITALY:

Selling in Italy, by Fernand Lavallee, OBR 65-68, 12 pp., printed, Oct. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

JAPAN:

Actual Condition of Low Grade Fishery Products Processing Industry, Studies on Fishery Economy No. 6, 71 pp., illus., printed in Japanese, Aug. 1965. Planning Section, Fisheries Administration Division, Fisheries Agency, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.

Contributions from the Department of Fisheries and the Fishery Research Laboratory, Kyushu University, no. 10, 1964, 245 pp., illus., printed in Japanese and English, July 1965. Department of Fisheries and Fishery Research Laboratory, Kyushu University, Fukuoka, Japan. Some of the articles are: "Studies on the floating seaweeds. IX--The floating seaweeds found on the sea around Japan," by S. Segawa, T. Sawada, and T. Yoshida; and "Studies on the external mucous substance of fishes. IX--Preparation of crystalline N-acetylneuraminic acid from the external mucous substance of loach," by N. Enomoto, H. Nakagawa, and Y. Tomiyasu.

Present State of Maritime Safety, 126 pp., printed in Japanese, May 1965. Maritime Safety Agency, Tokyo, Japan.

Production of Shallow Sea and Inland Water Fish Farming Industries and Inland Water Fisheries in 1964, Bulletin 40-115 (Suito-14), 7 pp., printed in Japanese, Aug. 1965. Statistics Research Division, Ministry of Agriculture and Forestry, 2-1, Kasumigaseki, Chiyoda-ku, Tokyo, Japan.

Available from the Faculty of Fisheries, Hokkaido University, Hokodate, Japan:

Bulletin of the Faculty of Fisheries, Hokkaido University, vol. 15, no. 1, May 1964, 62 pp., illus., printed in Japanese with Japanese summaries. Some of the articles are: "On the analysis of chum salmon scale pattern by use of auto-correlation coefficient," by R. Kawashima and K. Kyushin; "Studies on improvement of salmon gill-nets," by S. Nishiyama and S. Yamamoto; "Studies on the cleaning of air contamination substances from fish processing plants in fishery

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

towns. I," by E. Tanikawa, T. Motohiro, and M. Akiba; "Studies on the complete utilization of squid (*Ommastrephes sloani pacificus*). XXI," by E. Tanikawa, M. Akiba, and T. Motohiro; and "Freeze vacuum drying of marine products. IV," by K. Kobayashi and S. Igarashi.

, vol. 15, no. 2, Sept. 1965, 84 pp., illus., printed in Japanese with English summaries. A few of the articles are: "Survey of trawl grounds off the north-west coast of Australia with special reference to hydrographical condition on the grounds," by K. Masuda and S. Nakane; "On the oceanographical condition and the distribution of tuna fish in the Coral Sea in December 1962," by T. Sato and others; "Biochemical studies on muscle of sea animals. III," by A. Iida, K. Oishi, and K. Murata; "Likes and dislikes of fish meat. II; III," by K. Oishi, Y. Tamura, and A. Okumura; "Studies on the complete utilization of squid. XXII," by E. Tanikawa, M. Akiba, and T. Motohiro; and "Studies on keeping freshness of raw fish and shellfish. I," by E. Tanikawa, T. Motohiro, and M. Akiba.

, vol. 15, no. 3, Nov. 1964, 58 pp., illus., printed in Japanese with English summaries. Some of the articles are: "Studies on the fishery of mackerel by purse seines on the sea off southwest Hokkaido. IV," by H. Nakamura and S. Igarashi; "On the measurements of transfer functions related to the fishing training ship *Hokusei Maru*," by T. Sato and N. Sano; "Studies on the compounds specific for each group of marine algae. III," by K. Yabe, I. Tsujino, and T. Saito; and "Studies on complete utilization of squid (*Ommastrephes sloani pacificus*). XXIII," by E. Tanikawa, M. Akiba, and T. Motohiro.

, vol. 15, no. 4, March 1965, 69 pp., illus., printed in Japanese with English summaries. A few of the articles are: "A preliminary note on the effect of hydrostatic pressure on the behavior of some fish," by T. Nishiyama; "On nine warm-current seaweeds new to the northern coast of the Tsugaru Straits," by H. Yamamoto; "Fundamental studies on the phenomena of sticks in gill-netting. I," by K. Nashimoto; and "On some measured examples concerning the form change of salmon drift gill-net during the fishing process in the Okhotsk Sea," by M. Ishida, and others.

Data Record of Oceanographic Observations and Exploratory Fishing, No. 9, March 1965, 349 pp., illus., printed. Presents data gathered during cruises of the *Oshoro Maru*: Cruise 7 to the eastern Indian Ocean from Nov. 1963 to Feb. 1964; Cruise 8 to the south of Cape Erimo in May 1964; Cruise 9 to the northern North Pacific, Bering and Chukchi Sea from June to Aug.; and Cruise 10 to the sea area off Kitami in Sept. Also contains data on cruises by the *Hokusei Maru*: Cruise 15 to the South Pacific Ocean from Oct. 1963 to Jan. 1964; Cruise 16 (1) to the southern Kurile waters in June 1964; Cruise 16 (2) to the southern Kurile waters in June; Cruise 16 (3) to the Okhotsk Sea in July; and Cruise 16 (4) to the Okhotsk Sea in July.

"Early development of several species of Laminariales in Hokkaido," by Hiroshi Yabu, article, Memoirs of the Faculty of Fisheries, Hokkaido University, vol. 12, no. 1, 1964, 145 pp., illus., printed.

KOREA REPUBLIC:

Annual Report of Oceanographic Observations, vol. 12, 1963, 173 pp., illus., processed, 1965. Fisheries Research and Development Agency, Seoul, Republic of Korea.

LABOR LEGISLATION:

Part 800--Equal Pay for Equal Work under the Fair Labor Standards Act, WHPC Publication 1119, 13 pp., printed, 1965, 10 cents. (Reprinted from *Federal Register*, Sept. 9, 1965.) Wage and Hour and Public Contracts Divisions, U. S. Department of Labor, Washington, D. C. 20210. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

LAW OF THE SEA:

"International fisheries and the law of the sea," by Peter A. Larkin, article, *The Fishermen's News*, vol. 21, first issue, Oct. 1965, pp. 5, 10, 12, printed, single copy 15 cents. *The Fishermen's News*, Fishermen's Terminal, Seattle, Wash. 98119. The keynote address to the American Fisheries Society in Portland, Sept. 23, 1965, and the first of a series on the subject of law of the sea as it pertains to fisheries. Discusses in detail the problems of studying the biology of high-seas fisheries, the questions of economics involved, the appearance of large numbers of fishery commissions and councils, and the need "to use the correctly ascertained experience of the past to express a considered and unbiased belief on which future action can be based."

LOBSTER:

"Hummerfangst och hummerundersokningar" (Lobster fishery and lobster research), by Bernt I. Dybern, article, *Svenska Vastkustfiskaren*, vol. 35, no. 17, Sept. 10, 1965, pp. 296-299, illus., printed in Swedish. Svenska Vastkustfiskarnas Centralforbund, Ekonomiskottet Postbox 1015, Goteborg 4, Sweden.

"Leturhumarveidarnar vid Island" (Norway lobster fishing off Iceland), article, *Aegir*, vol. 58, no. 13, July 15, 1965, pp. 221-229, illus., printed in Icelandic with English summary. Fiskigilag Islands, Reykjavik, Iceland.

MARINE ALGAE:

"The marine algae of Bahia de Jobos, Puerto Rico," by L. R. Almodovar, article, *Nova Hedwigia*, vol. 7, no. 1/2, 1964, pp. 33-52, printed. Nova Hedwigia, Box 166, Weinheim, Federal Republic of Germany.

Vodorosli Barentseva Morya (Algae of the Barents Sea), by G. Barashkov, 48 pp., illus., printed in Russian, 1962, 6 Kop. (about US\$0.10). Knigoizdat, Murmansk, U.S.S.R.

MEDITERRANEAN:

"Aspectos del crecimiento relativo en peces del Mediterraneo Occidental" (Aspects of the relative growth of fish of the Western Mediterranean), by C. Bas, article, *Investigacion Pesquera*, vol. 27, Oct. 1964, pp. 13-119, illus., printed in Spanish with English summary. Instituto de Investigaciones Pesqueras, Paseo Nacional, s/n, Barcelona-3, Spain.

NETS:

Comparisons of Two Types of Gillnets Used for Lake Survey Purposes in Minnesota-Ontario Boundary

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Waters, by Thomas J. H. Bonde, 11 pp., illus., printed, 1963. Section of Research and Planning, Division of Game and Fish, St. Paul, Minn.

NEW ENGLAND:

The New England Fishing Industry: Functional Markets for Finned Food Fish I, by Joseph F. Farrell and Harlan C. Lampe, Economics of Marine Resources 2, Bulletin 379, 28 pp., illus., printed, June 1965. Publications Office, 16 Woodward Hall, University of Rhode Island, Kingston, Rhode Island 02881. The relevant species-group in this investigation were groundfish (haddock, cod, pollock, flounder, and white hake) and ocean perch. In 1962, the New England catch of fish within this group accounted for 76 percent of all food fish landed in the region. The report covers findings related to market levels in the industry, the markets viewed as levels of demand, the landings market, the wholesaler-processor market, the imports market, the cold storage holdings market, the retail market, and the markets in retrospect--summary and framework for a model.

"The New England fishing industry. II--Impact of Government aid," by Frederick W. Bell, article, New England Business Review, Sept. 1965, pp. 2-9, printed. Federal Reserve Bank of Boston, Boston, Mass. Explains how New England fishermen are planning a fleet expansion during the next 5 years. The impetus for this revival stems from the new technology of stern trawling and even more from the Federal 1964 Fishing Fleet Improvement Act. That Act makes available subsidies ranging up to 50 percent of fishing vessel construction costs. The success of the Act in upgrading and expanding the New England fleet will depend on how it affects the region's competitive position in relation to imported fishery products. For New England as a whole, the Act may reverse the decline in the fleet and stabilize the region's share of the market. The new technology of stern trawling will help raise productivity, while providing increased safety for the crew and higher wages. Both the subsidy and the broader use of stern trawlers will offset some of the advantages of foreign competitors.

NORTH ATLANTIC:

"Osnovnye rezultaty i zadachy promyslovo-okeanograficheskikh issledovaniy v ralone deyatel'nosti mezhdunarodnoi komissii po rybolovstvu v Severo-Zapadnoi Atlantike (IKNAF)" (The main results and tasks of the fisheries and oceanographic studies in the realm of the activities of the International Commission for the North Atlantic Fisheries, ICNAF), by M. Adrov, article, Materialy II konferentsii po problemam Vzalnodelstviye atmosfery i gidrosfery v severnoi chasti Atlanticheskogo okeana (Information on the Second Conference on Problems of the Interaction of the Atmosphere and Hydrosphere in the North Atlantic Ocean), pp. 233-243, printed in Russian, 1964. Leningrad University, Leningrad, U.S.S.R.

NORWAY:

"Det var fiskerne som fant utveien" (It was the fisheries that found their way out of difficulty), article, Konkyljen, vol. 10, no. 1, Jan. 1965, pp. 4-6, illus., printed in Norwegian. Stord Bartz Industri A. s, Bergen, Norway.

"Garantikassen for lottfiskere betalte i 1964 tilskott på over kr. 5.8 millioner" (Guarantee for fishermen's

shares in 1964 paid a contribution of over 5.8 million kroner), article, Fiskaren, vol. 42, no. 33, August 18, 1965, p. 5, printed in Norwegian. Norges Fiskerlag, Postboks 172, Bergen, Norway.

"Lønnsomheten av fiskefartøyer over 40 fot i 1963, sesongresultater" (Profitability of fishing vessels of over 40 feet in 1963-season's results), article, Fiskets Gang, vol. 51, Sept. 2, 1965, pp. 498-509, printed in Norwegian with English summary. Fiskeridirektoratet, Radstuplass 10, Bergen Norway.

NUTRITION:

An Anthology of Food Science. Volume 2--Milestones in Nutrition, by Samuel A. Goldblith and Maynard A. Joslyn, 812 pp., illus., printed, 1964, \$14.25. The Avi Publishing Co., Inc., P. O. Box 388, Westport, Conn. This volume presents some of the important scientific publications and observations of the past 150 years, and particularly of the past 50 years, relating to the nutritional sciences. Food scientists and technologists now are increasingly concerned with the problem of meeting the present and foreseeable world requirement for food. Nutritional adequacy as well as economic availability are basic to such considerations. Included are chapters on the early history of nutrition, the feeding of purified diets and the discovery of the vitamins, vitamin nomenclature, Vitamin A, Vitamin D, the essential fatty acids, and Vitamin B₁. Other chapters cover Vitamin C, riboflavin, nicotinic acid and pellagra, and the multiple nature of the Vitamin B complex, amino acids and proteins, minerals, and the future of nutrition. Bibliographies are included at the end of most of the chapters. As a summary work on nutrition the book will be useful to students and researchers in nutrition, as well as to workers in institutional food preparation.

OCEANOGRAPHY:

"Alvin reaches 6,000 feet in dive," by Larry L. Booda, article, Under Sea Technology, vol. 6, no. 9, Sept. 1965, pp. 20-22, illus., printed, single copy \$1. Compass Publications Inc., 617 Lynn Bldg., 1111 N. 19th St., Arlington, Va. 22209. Alvin, the Navy's first true deep-diving research submarine (as contrasted to the vertical traveling bathyscaph Trieste) reached its design depth of 6,000 feet on July 20, 1965. It uses a high-strength steel sphere as the pressure hull to contain personnel and scientific instruments. The 7-foot diameter sphere is built of 1.33-inch thick HY 100 steel, used for the first time in an undersea vehicle. The 22-foot long, 8-foot beam submersible displaces 13 tons. Surfaced, it has a draft of 8.5 feet. Top speed is 6-8 knots. Cruising speed is 2.5 knots for a submerged range of 20-25 miles. The operating design depth is 6,000 feet with a safety factor of 1.8. Design of Alvin was a cooperative effort of Woods Hole Oceanographic Institution personnel and the Applied Sciences Division of Litton Industries. Alvin is the first phase of the Navy's deep-sea research vehicle program. It will permit on-site observations by oceanographers; biologists will be able to observe directly concentrations and behavior of marine life in deep water.

A Bibliography of the Oceanography of the Tasman and Coral Seas, 1860-1960, by Betty N. Krebs, ITS Bulletin 156, New Zealand Oceanographic Institute Memoir No. 24, 27 pp., printed, 1964. New Zealand Oceanographic Institute, Wellington, New Zealand.

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Marine Science in Denmark and Sweden, by Adrian T. Richards, ONRL 81-62, 15 pp., printed, 1962. Office of Naval Research, U. S. Navy, Washington, D. C.

Oceanography--A Study of Inner Space, by Warren E. Yasso, 176 pp., illus., printed, 1965, \$2.50. Holt, Rinehart, and Winston, Inc., 383 Madison Ave., New York, N. Y. 10017. In his introduction, the author defines the limits of the earth's oceans and presents them in a new perspective when he says, "Truly, the oceans are hardly more than a film of salt water on the surface of our planet!" He goes on to explain the recent recognition of the importance of the oceans, the definition of oceanography and fields of this science, early explorers of the sea, beginnings of deep-sea research in the 19th Century, and United States oceanographic research since 1877. There follow chapters on the chemistry of the sea, oceanic circulation, the earth's structure, topography of ocean basins, oceanic sediments and turbidity currents, and research submersibles. A chapter on marine biology explains life in the oceans, marine environments, plankton organisms, nekton or intermediate and abyssal fish, benthos or bottom-dwelling animals, fish population and the food supply, ocean mammals, and the future of marine biology. The book has a short bibliography, detailed glossary of oceanographic terms, and an adequate index. Written interestingly in layman's language, this book will hold the attention of the general reader as well as high school and college students.

Oceans: An Atlas-History of Man's Exploration of the Deep, edited by George Edmund R. Deacon, 297 pp., illus., printed, 1962. Paul Hamlyn, Spring Pl., London NW5, England.

Serial Atlas of the Marine Environment--Zooplankton Indicator Species in the North Sea, by James H. Fraser; The Trace Elements, by Robert Johnston, Folio 8, illus., printed 1965, looseleaf \$4, bound \$6. Serial Atlas of the Marine Environment, American Geographical Society, Broadway at 156th St., New York, N. Y. 10032.

--Meteorology of the North Sea, by Frank E. Lumb, Folio 9, illus., printed, 1965, looseleaf \$4, bound \$6.

"What reflects sound in the ocean?" article, New Scientist, vol. 27, no. 461, Sept. 16, 1965, p. 697, printed, single copy 1s. 3d. (about US\$0.20). Cromwell House, Fulwood Pl., High Holborn, London WC1, England.

OCEAN PERCH:

"Age and growth rate of the Pacific ocean perch of the Bering Sea," by O. F. Gritsenko, article, Trudy Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, vol. 48, 1963, pp. 313-316, printed in Russian. Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khozyaistva i Okeanografii, Moscow, U.S.S.R.

OYSTERS:

"The accumulation of enteric viruses by the oyster, *Crassostrea virginica*," by T. G. Metcalf and W. C. Stiles, article, Journal of Infectious Diseases, vol. 115, no. 1, 1965, pp. 68-76, printed. University of Chicago Press, 5750 Ellis Ave., Chicago, Ill.

"Contraction in the opaque part of the adductor muscle of the oyster (*Crassostrea angulata*)," by B. M. Millman, article, Journal of Physiology, vol. 173, no. 2, 1964, pp. 238-262, illus., printed. Cambridge University Press, 200 Euston Rd., London NW1, England.

"Dynamic merchandising program needed to develop frozen oyster market," by Duane D. Shelton, article, Quick Frozen Foods, vol. 28, no. 2, Sept. 1965, pp. 97-101, illus., printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019. The author discusses how United States growers seem ready to convert to freezing oysters but need assistance in creating new products and establishing a vital promotional approach. A new generation of oyster farmers is setting a vigorous pace in rebuilding oyster production. Most favorable aspect of future development is that the profitability in oyster production is second to none in the fishing industry.

The Immigrant Oyster (OSTREA GIGAS), Now Known as the Pacific Oyster, by E. N. Steele, 202 pp., illus., printed, 1964, hard bound \$4.50, paper bound \$3.50, plus postage. Pacific Coast Oyster Growers Association, 66 Marion St., Seattle, Wash. 98104. Documents the introduction and development of Pacific oysters from Japan into Puget Sound. The first chapter tells how the oyster spat were selected in Japan and shipped to Washington by two Japanese, how they were planted in Samish Bay, and how the first planting was successful. Following are chapters describing the early years of cultivation, cultivation of Eastern and Olympia oysters, cultivation of Pacific oysters, experiments in artificial seed setting, formation of the Pacific Oyster Growers Association, and the national depression of the 1930's and the Oyster Code. Other chapters tell of the war with Japan and its effect on the Pacific oyster industry, postwar seed from Japan, the Pacific oyster industry entrance into an era of big business in the late 1940's, statistics on production, reproduction of Pacific oysters in the State of Washington, the official recognition by the industry of the economic value of the Pacific oyster, growth of the industry, and processing oysters by canning, freezing, stewing, and smoking. An appendix reports on the fight for the preservation of the Pacific oyster from water pollution. This is an amusing and informative book, of interest to oyster producers and distributors as well as the general reader.

"Seafood chief reports on status of Alabama's oyster industry," by George W. Allen, article, Alabama Conservationist, vol. 35, no. 4, June-July 1965, pp. 16-19, illus., printed. Alabama Department of Conservation, 64 N. Union St., Montgomery, Ala. 36104.

"A system of oyster culture for West Pakistan Coast," by S. Azhar Hasan, article, Agricultural Pakistan, vol. 14, no. 3, 1963, pp. 310-328, illus., printed. Agricultural Pakistan, Central Publications Branch, Block 44, Karachi, Pakistan.

PACIFIC OCEAN:

Abstracts of Symposium Papers, Tenth Pacific Science Congress, Honolulu, Hawaii, 1961, 490 pp., printed. Pacific Science Association, Bernice P. Bishop Museum, Honolulu, Hawaii 96819. In the section on Symposium on Limnology and Freshwater Fisheries, two of the articles abstracted are: "The status of fish passage in the Pacific Northwest," by K. G. Weber, under

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Symposium on Fishery Protection in Relation to Dams and Water Development Projects; and "The Promotion of productivity in the fish farm," by Nobuyuki Kawamoto, under Symposium on Progress in the Culture of Pond Fishes. In the section on Symposium on Marine Biology and Fisheries, some of the abstracts are: under Symposium on Biological and Physical Aspects of Light in the Sea (a) Underwater Light Measurements for Biological Studies, "Luminescence and vision in marine animals," by J. A. C. Nicol; under Symposium on Endocrinology of Fishes, "Hormonal factors in smolting in salmon," by Madeleine Oliveureau and Maurice Fontaine; under Symposium on Factors Affecting the Behavior of Predaceous Marine Fishes, Especially Sharks, "Some aspects of olfactory and visual responses in Pacific salmon," by J. R. Brett and C. Groot, "Visual discrimination in lemon sharks," by Eugenie Clark, "Factors affecting the predaceous behavior of sharks in South Africa," by David H. Davies, "The visual apparatus of sharks and its probable role in predation," by Perry W. Gilbert, "Environmental and behavioral factors which influence the migration of sharks," by A. M. Olsen, "Food of some tropical predaceous fish, including sharks, from net and line fishing records," by A. M. Rapson, "Some environmental factors affecting the feeding behavior of sharks," by Stewart Springer, and "The role of olfaction in shark predation," by Albert L. Tester; under Symposium on immunogenetic concepts in marine population research, "Serology of Atlantic clupeoid fishes," by Carl J. Sindermann, "Studies on the erythrocyte antigens of the skipjack tuna (*Katsuwonus pelamis*)," by Lucian M. Sprague and Leslie I. Nakashima, "On the blood types of yellow-fin and big-eye tuna," by Akimi Suzuki, and "Serological differentiation of sardine subpopulations off California," by Andrew M. Vrooman. Included in the Symposium on Oceanography are abstracted articles under Symposia on Deep Circulation in the Pacific, Equatorial Circulation in the Pacific, North Pacific Circulation, Present and Future Trends in Oceanographic Instrumentation, Radioactive Tracers in Oceanography, and on Tsunamis.

PAKISTAN:

"Marine fisheries of Pakistan. 1--Present status," by N. Alam Khandker, article, *Pakistan Journal of Science*, vol. 15, no. 5, 1963, pp. 214-216, illus., printed, Pakistan Association for the Advancement of Science, Lahore, Pakistan.

PERU:

"Armadores deben 897 millones" (Vessel owners owe 897 million soles), article, *Pesca*, vol. 10, no. 4, April 1965, pp. 12-15, illus., printed in Spanish with English summary, single copy \$1. Pesca, Av. Wilson 911, Oficina 301, Apartado 877, Lima, Peru. A survey of anchovy vessel owners show that possibilities of getting out of debt are poor for those with boats of under 100 tons. Apparently only boats of 160 tons and over are profitable. Anchovy populations lately seem to concentrate far from the traditional fishing grounds; thus larger boats with better nets and equipment are needed for profitable operations.

"Peru consolidates fish meal industry," by D. J. McEachran, article, *Foreign Trade*, vol. 124, no. 6, September 18, 1965, pp. 6-9, illus., printed, single copy C\$0.25. Queen's Printer, Government Printing Bureau, Ottawa, Canada. In only 15 years, Peru has

built up on the anchoveta swarming in the cold Humboldt Current the world's biggest fish meal industry. Production of fish meal for animal feed exceeded 1.5 million metric tons in 1964. It has become the country's largest export. Fish meal sales in 1964 accounted for nearly one-quarter of the country's total exports, overshadowing the output of the basic copper, cotton, and sugar industries. Direct investment in the fish meal industry is now estimated at more than \$300 million. Problems that accompanied this rapid expansion are now being corrected, and the future looks promising, asserts the author.

Principal Manufacturing Industries in Peru. Part 1; Part 2; by Richard H. Mullins, OBR 65-58-A; OBR 65-58-B, 20 pp., 24 pp., printed, Aug. 1965, 15 cents each. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Part 1 contains a section on canned fish, frozen fish, fish meal, and fish oil.

PHYSIOLOGY:

"Electrical and mechanical responses in deep abdominal extensor muscles of crayfish (*Orconectes virilis*) and lobster (*Homarus americanus*)," by Bernard C. Abbott and I. Parnas, article, *Journal of General Physiology*, vol. 48, no. 5, pt. 1, 1965, pp. 919-931, illus., printed. Rockefeller Institute of Medical Research, York Ave. and 66th St., New York, N.Y. 10021.

PLANKTON:

Plankton, vol. 1, no. 10, June 1, 1965; vol. 1, no. 11, June 15, 1965, 4 pp. each, illus., processed. Marine Laboratory, Florida State Board of Conservation, Bayboro Harbor, St. Petersburg, Fla.

POLAND:

Basic Data on the Economy of Poland, by Leon Lewins and Oleg Jerschowsky, OBR 65-65, 24 pp., printed, Sept. 1965, 15 cents. Bureau of International Commerce, Washington, D.C. (For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.)

"La Pologne au troisième rang dans la construction mondiale de navires de pêche" (Poland in third place in world construction of fishing vessels), article, *France Pêche*, no. 98, Sept. 1965, pp. 24, 27, illus., printed in French, single copy 2.5 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France.

POLLUTION:

Fish and River Pollution, by J. R. Erichsen Jones, 211 pp., illus., printed, 1964. Butterworth, Inc., 7300 Pearl St., Bethesda, Md.

PORTUGAL:

Estatística das Pescas Marítimas no Continente e Ilhas Adjacentes no Ano de 1963 (Marine Fishery Statistics on the Continent and Adjacent Islands in the Year 1963), 143 pp., printed in Portuguese, 1964. Direcção das Pescarias, Ministério da Marinha, Lisbon, Portugal.

PORTUGUESE WEST AFRICA:

"A pesca na Província de S. Tomé e Príncipe" (The fishery in the Province of Santo Tome and Principe), by Romulo Figueiredo, article, *Boletim da Pesca*, no. 87, June 1965, pp. 11-25, printed in Portuguese. Gabinete de Estudos das Pescas, R.S. Bento, 644, Lisbon, Portugal.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

PRESERVATION:

"Neue wege zur herstellung haltbarer fisch-preserven" (New methods for stable preparation of fish preserves), by W. Ludorff, article, Fette, Seifen, Anstrichmittel, vol. 65, no. 2, 1963, pp. 139-144, printed in German. Industrieverlag von Herhausen K. G., 24 Rodingsmarkt., Hamburg II, Federal Republic of Germany.

QUALITY:

"Fangtechnik und fischqualität" (Fishing technique and fish quality), by A. von Brandt, article, Fette, Seifen, Anstrichmittel, vol. 65, no. 2, 1963, pp. 144-146, printed in German. Industrieverlag von Herhausen K. G., 24 Rodingsmarkt, Hamburg II, Federal Republic of Germany.

RADIATION PRESERVATION:

Application of Radiation-Pasteurization Processes to Pacific Crab and Flounder, Final Summary, Nov. 1963-Oct. 1964, TID-21404, 118 pp., illus., printed, Nov. 1964. Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151.

"Radiation and pasteurization of raw and chlortetracycline-treated shrimp," by A. A. Awad, Russell O. Sinnhuber, and A. W. Anderson, article, Food Technology, vol. 19, no. 5, 1965, pp. 182-184, printed, single copy \$1.50. The Garrard Press, 510 N. Hickory St., Champaign, Ill. 61823. Reports on a study of extension of the storage life of raw shrimp with pasteurization levels of ionizing radiations in combination with refrigerated storage at 38° F. and chlorotetracycline. Levels of irradiation which do not impart a significant irradiation odor or taste (pasteurization radiation threshold) to raw shrimp were determined. Those levels were 0.5 and 0.75 megarad. The storage life of the shrimp irradiated at 0.5 megarad was extended to 5 weeks, compared with 1 week for the unirradiated samples held at the same temperature. During an 8-10 week storage period, the samples which received doses of 0.5 megarad with CTC and those which received 0.75 megarad with and without CTC remained in good condition.

Radiation Pasteurization of Shrimp and Oysters, Final Summary Report for the Period January-December 1964, by Arthur F. Novak and Joseph A. Liuzzo, ORO-626, 29 pp., processed, Jan. 15, 1965. Division of Technical Information, U. S. Atomic Energy Commission, Washington, D. C. (For sale by the Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Braddock and Port Royal Rds., Springfield, Va. 22151.) During this study, it was found that low-dose gamma radiation employing cobalt 60 can be used to extend the storage life of Gulf shrimp and oysters. Many field trials on consumer acceptance of radiation pasteurized shrimp and oysters were successful according to results obtained from organoleptic, chemical, and bacteriological tests of the products. The procedures employed for obtaining the fresh shellfish, the method of handling and storing, and the time of holding prior to irradiation are factors involved in the keeping qualities after irradiation. Only products of high initial quality can be irradiated successfully. This process should provide advantages to the fisherman, processor, distributor, and consumer. Market prices of shellfish, now subject to fluctuations due to overabun-

dance or scarcity, would tend to be stabilized with the widespread use of this process.

REFRIGERATION:

"Apparatus for shipboard storage and refrigeration of freshly caught fish," by M. J. Puretic, Abstracts from Current Scientific and Technical Literature, vol. 17, Oct. 1964, p. 445, Abstract No. 2407, printed, British Food Manufacturing Research Association, Randalls Rd. Leatherhead, Surrey, England.

Articles from Annex 1964-3, Bulletin, International Institute of Refrigeration, Institut International du Froid, 177, Blvd. Malesherbes, Paris (17^e), France:

"Observations on the possible development of refrigeration application in fish storage and distribution in tropical countries," by J. Gousset and G. Moal, pp. 157-170.

"Refrigeration of fish," by F. Bramsnaes, pp. 143-156.

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"Cause of variation in time of maturation of pink salmon spawners in 1962," by V. V. Azbelev and B. V. Istoshin, article, Materialy Rybokhozyaistvennykh Issledovaniy Severnogo Basseina, no. 1, 1963, pp. 32-34, printed in Russian. Polarnyi Nauchno-Issledovatel'skii i Proektnyi Institut Morskogo Rybnogo Khozyaistva i Okeanografii, Moscow, U.S.S.R.

"Fecundity of Oncorhynchus keta in the Amur River," by T. N. Belyanina, article, Nauchnye Doklady Vyshei Shkoly, Biologicheskie Nauki, no. 4, 1963, pp. 24-30, printed in Russian. Gosudarstvennoe Izdatel'stvo "Vysshiaia Shkola," Podmosenskii per. 20, Moscow B-62, U.S.S.R.

"Food requirements for salmonids, and the main food used for feeding in artificial culture," by K. A. Faktorovich, article, Izvestiya Gosniorkh, vol. 54, 1963, pp. 64-90, printed in Russian. Gosudarstvennyi Nauchno-Issledovatel'skii Institut Ozer'nogo i Rechnogo Rybnogo Khozyaistva, Moscow, U.S.S.R.

A Microcytic Anemia of Juvenile Chinook Salmon Resulting from Diets Deficient in Vitamin E, by Cecil M. Whitmore, Contribution No. 29, 31 pp., illus., printed, March 1965. Oregon Fish Commission Research Laboratory, Rte. 2, Box 31A, Clackamas, Oreg. 97015.

Pituitary Hormones of the Pacific Salmon. I--Response of Gonads in Immature Trout (SALMO GAIRDNERII) to Extracts of Pituitary Glands from Adult Pacific Salmon (ONCORHYNCHUS), by P. J. Schmidt and others, 10 pp., illus., printed. (Reprinted from General and Comparative Endocrinology, vol. 5, no. 2, April 1965, pp. 197-206.) Academic Press Inc., 111 - 5th Ave., New York 3, N. Y.

"Reproductive ecology of masu (Oncorhynchus masu, Brevoort)," by A. I. Smirnov, article, Dokl. Akad. Nauk SSSR Biol. Sect., no. 1543 (1/6), 1962, pp. 334-336, illus., printed in Russian. Akademiia Nauk SSSR, Podmosenskii per. 21, Moscow B-64, U.S.S.R.

Articles from Voprosy Ikhtiologii, printed in Russian. Akademiia Nauk SSSR, Ikhtiologicheskaiia Komissaiia, Moscow, U.S.S.R.:

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Growth and structure of the pink salmon scale," by R. I. Enyutina, vol. 3, no. 4, 1963, pp. 751-754.

"Helminths as biological indicators of the local stock of anadromous Amur salmon (*Oncorhynchus*)," by A. Kh. Akhmerov, vol. 3, no. 3, 1963, pp. 536-555.

"Influence of predators on the young of *Oncorhynchus gorbusha* (Walb.) and *Oncorhynchus keta* (Walb.) in the White and Barents Seas," by E. L. Bakshanskii, vol. 4, no. 1, 1964, pp. 136-141.

SARDINES:

"Effektiv sardinproduksjon i Maine" (Efficient sardine production in Maine), article, *Tidsskrift for Hermetikindustri* (Norwegian Canners Export Journal), vol. 51, no. 8, August 1965, pp. 288-289, illus., printed in Norwegian. De Norske Hermetikfabrikers Landsforening, Stavanger, Norway.

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SAURY:

Japanese Canned Saury, 8 pp., illus., printed in Japanese. Japan Canned Saury Packers Association, No. 18, 2-chome, Marunouchi, Chiyoda-ku, Tokyo, Japan.

SEALS:

"K voprosu o pitanii grenlandskogo tyulenyia" (The feeding habits of the harp seal—*Phoca groenlandica*), by Yu. K. Timoshenko, article, *Sb. Nauch. Issled. Rabot. Sev. Otd. Polyarnogo Nauch. Issled. Proekt. Inst. Morskogo Rybn. Khoz. Okeangr.*, 1962, pp. 48-52, printed in Russian. Institut Morskogo Rybnogo Khoziaistva i Okeanografii im. N. M. Knipovicha, Murmansk, U.S.S.R.

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Methods for Increasing Production of Edible Seaweeds, by Shunzo Suto, Fisheries Propagation Series 9, 36 pp., printed in Japanese, June 1965. Japan Fisheries Conservation Association, 6th Fl., Zenkoku Choson Kaikan, 17-banchi, 1-chome, Nagata-cho, Chiyoda-ku, Tokyo, Japan.

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"Susquehanna River shad study," by Frank T. Carlson, article, *Pennsylvania Angler*, vol. 34, no. 10, Oct. 1965, pp. 1-7, illus., printed, single copy 25 cents. Pennsylvania Fish Commission, South Office Bldg., Harrisburg, Pa.

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"Biology of shrimps in the western Gulf of Alaska," by B. G. Ivanov, article, *Trudy Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii*, vol. 48, 1963, pp. 207-218, printed in Russian. Vsesoyuznyi Nauchno-Issledovatel'skii Institut Morskogo Rybnogo Khoziaistva i Okeanografii, Moscow, U.S.S.R.

"Dans les eaux de Guyane, l'échec d'une aventure crevette" (In the waters off Guiana, the end of a shrimp fishing venture), by Lucien Gourong, article, *France*

Pêche, no. 98, Sept. 1965, pp. 28-32, illus., printed in French, single copy 2.5 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France.

"Effects of injected biological stains on oxygen uptake by shrimp," by Zoula P. Zein-Eldin and Edward F. Klima, article, *Transactions of the American Fisheries Society*, vol. 94, no. 3, 1965, pp. 277-278, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

"Growth and survival of postlarval *Penaeus aztecus* under controlled conditions of temperature and salinity," by Zoula P. Zein-Eldin and David V. Aldrich, article, *Biological Bulletin*, vol. 129, no. 1, 1965, pp. 199-216, printed. The Marine Biological Laboratory, Woods Hole, Mass.

SMALL BUSINESS MANAGEMENT:

Tax Guide for Small Business, 1966, Publication No. 334, 160 pp., illus., printed, 1965, 50 cents. Internal Revenue Service, U. S. Treasury Department, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A guide for use in filing the 1965 income tax returns, excise tax returns, and other returns for 1966. Answers the Federal tax questions of corporations, partnerships, and sole proprietorships. Explains in plain layman's language the tax results from buying, starting, operating, and the sale and other disposition of a business. In addition, contains a tax calendar for 1966 which should prove helpful to the businessman throughout the year, since it indicates what he should do and when he should do it in regard to the various Federal taxes. Also has a checklist of special interest to the man just starting in business in that it affords a quick method for determining for what taxes he may be liable. This edition has been brought up to date and includes explanations of the provisions of the new tax laws, as they affect businessmen. Some of the changes discussed are new lower rates, income averaging, travel expense rules, interest on certain deferred payments, and disposition of depreciable property.

SPAIN:

"Conservas Espanolas en crisis" (Spanish canned fishery products in crisis), article, *Pesca*, vol. 10, no. 4, April 1965, pp. 32-34, illus., printed in Spanish with English summary, single copy \$1. Pesca, Av. Wilson 911, Oficina 301, Apartado 877, Lima, Peru.

Investigacion Pesquera, vol. 28, April 1965, 246 pp., illus., printed in Spanish with English summaries. Instituto de Investigaciones Pesqueras, Paseo Nacional, s/n, Barcelona-3, Spain. Some of the articles are: "Edad y crecimiento de la merluza (*Merluccius merluccius* L.) del noroeste del Mediterraneo Espanol" (Age and development of the hake of the northwest Spanish Mediterranean), by A. Figueras; "Sobre la dinamica de la pesqueria de arrastre de Castellon" (On the dynamics of the trawl fishery of Castellon), by M. G. Larraneta and P. Suau; "Empleo de metabisulfito potasico en la conservacion y prevencion del ennegrecimiento (melanosis) de los crustaceos" (Use of potassium metabisulfite in the conservation and prevention of blackening of crustaceans), by Rafael Establier; "Composicion quimica estacional de la carne de langostino, *Penaeus kerathurus* (Forsk.) (1975) y consideraciones biologicas" (Seasonal chemical

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

composition of the meat of the shrimp, *Penaeus kerathurus* Forskal 1775, and biological considerations), by F. Munoz; and "Estudio del crecimiento del bogavante (*Homarus vulgaris* Milne Edwards) del noroeste Espanol" (Study of the development of the lobster, *Homarus vulgaris* Milne Edwards, of the Spanish northeast), by A. Figueras.

"Pesquerias, produccion y tecnica" (Fisheries, production, and technique), by V. Paz-Andrade; "Panorama actual de la pesca Espanola" (Present view of the Spanish fishery), by D. Ignacio del Cuvillo y Merello; "El crecimiento anual de la flota pesquera espanola" (The annual growth of the Spanish fishing fleet); "La normalizacion de buques en la renovacion de la flota pesquera" (The standardization of vessels in the renewal of the fishing fleet); "Los puertos y la pesca en 1964" (The ports and the fishery in 1964); "Balanza exterior del comercio pesquero Espanol en 1964" (The balance of foreign trade in Spanish fishery products in 1964); "La pesca y la evolucion de la flota" (The fishery and the development of the fleet), by Mariano Lobo Andrada; "Conservas 1964: evolucion favorable" (Canning in 1964: favorable development); and "1964 produccion pesquera maritima Espanola" (1964 Spanish marine fishery production), articles, *Industrias Pesqueras* (Statistics Annual for 1964), vol. 39, nos. 913-914, May 15, 1965, pp. 173, 175, 178-179, 181-182, 183, 185, 187, 188-190, 198-200, 219, 221, 224-225, 227, 240-241, 248-249, 251, 253-255, illus., printed in Spanish. *Industria Pesqueras*, Apartado 35, Vigo, Spain.

"Los rendimientos en la experiencia de la pesca de arrastre" (The annual production in the experimental trawl fishery), by P. Suau, article, *Puntal*, vol. 12, no. 137, Aug. 1965, pp. 10-13, 15, illus., printed in Spanish, single copy 20 ptas. (about US\$0.35). *Puntal*, Apartado de Correos 316, Alicante, Spain.

SPINY LOBSTER:

"INOS chairman describes probe into promising shrimp and prawn stocks"; "Growing market in Europe for live rock lobster"; "How long will Vema rock lobster last?"; articles, *The South African Shipping News and Fishing Industry Review*, vol. 20, no. 6, June 1965, pp. 81-83; 85, 87; 91, 93, illus., printed, single copy 30¢ (about US\$0.45). Thomson Newspapers, South Africa (Pty.) Ltd., 8th Fl., Trust House, Thibault Sq., Box 80, Cape Town, Republic of South Africa. The first article discusses a large new venture operating along the coast of Mozambique, now at the stage where it can catch and process shrimp, spiny lobster, and other fishery products on a satisfactory commercial scale. The second tells how from a difficult start on a small scale only 2 years ago, the export of live spiny lobsters by air to Europe is growing into a flourishing section of the South African fishing industry. Opened in France, the market is now expanding to other European countries and exports are reported to be averaging 30-40 tons a month. The final article poses and answers the question of whether the spiny lobster stocks on the Vema seamount will prove to be a lasting valuable new asset or no more than a transient bonanza to be drained of its stocks in a brief burst of uncontrolled fishing.

Notes on Postlarvae of *PANULIRUS ARGUS*, by Rose Witham, Robert M. Ingle, and Harold W. Wims, Jr.,

Contribution No. 83, 98 pp., illus., printed, 1964. Marine Laboratory, Florida State Board of Conservation, Bayboro Harbor, St. Petersburg, Fla.

SPRAT:

"Experimental and commercial preservation of Caspian sprats with sodium pyrosulfite for the production of fish meal," by S. V. Ezerskii, article, *Trudy Instituta Ikhtologii i Rybnogo Khozyaistva*, vol. 4, 1963, pp. 211-233, printed in Russian. *Akademiia Nauk Kazakh SSSR*, Alma-Ata, Kazakh S.S.R.

STERN TRAWLING:

Stern Trawling Conference, Grimsby, England, 1963, edited by George Ward, 102 pp., illus., printed, 1964. *Fishing News (Books)*, Ltd., Ludgate House, 110 Fleet St., London EC4, England.

STURGEON:

"Food for small sturgeons," by V. V. Bal' and L. S. Korochlina, article, *Izvestiya Vysshikh Uchebnykh Zavedenii, Pishchevaya Tekhnologiya*, no. 6, 1963, pp. 93-94, printed in Russian. *Izdatel'stvo Krasnodarskogo Instituta Tishchevoi Promyshlennosti*, Ul. Kransnaya, 135, Kransnodar, U.S.S.R.

"Growth of Siberian sturgeon, *Acipenser baeri* Brandt, in Lena River," by L. I. Erkalov, article, *Byulleten' Moskovskogo Obschestva Ispytatelei Prirody, Otdel. Biologicheskii*, no. 3 (supplement), 1964, p. 160, printed in Russian. *Moskovskogo Universiteta*, Moscow, U.S.S.R.

Articles from *Trudy Vses. Nauch. Issled. Inst. Morsk. Rybn. Khoz. Okeanogr.*, vol. 52, 1964, printed in Russian. *Four Continent Book Corp.*, 156 Fifth Ave., New York, N. Y. 10010:

"Biologiya i promysel kaspiiskoi belugi" (Biology and fishery of the Caspian beluga sturgeon *Huso huso*), by N. Ya. Babushkin, pp. 183-258.

"Osetrovye SSSR i ikh vosproizvodstvo" (Sturgeons of the U.S.S.R. and their production), by N. I. Kozhin, pp. 21-58.

"Osetry severo-zapadnoi chasti Chernogo morya" (Sturgeons of the northwestern Black Sea), by A. I. Ambroz, pp. 287-347.

SWEDEN:

Establishing a Business in Sweden, by Grant Olson, OBR 65-62, 12 pp., printed, Aug. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

THAWING:

"Dielectric thawing for frozen foods," by Leo Walter, article, *Canner/Packer*, vol. 134, Feb. 1965, pp. 36-37, printed. *Vance Publishing Co.*, 59 E. Monroe St., Chicago, Ill. 60603.

TRADE LISTS:

The U. S. Department of Commerce has published the following mimeographed trade lists. Copies may be obtained by firms in the United States from the Commercial Intelligence Division, Office of International Trade Promotion, Bureau of International Commerce,

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U. S. Department of Commerce, Washington, D. C. 20230, or from Department of Commerce field offices for \$1 each. List names and addresses, size of firms, and types of products (including fish and shellfish) handled by each firm:

Canneries and Frozen Foods--Producers and Exporters--Brazil, 14 pp., Sept. 1965.

Canneries and Frozen Foods--Producers and Exporters--Guatemala, 7 pp., Sept. 1965.

Canneries and Frozen Foods--Producers and Exporters--India, 21 pp., Sept. 1965.

Canneries and Frozen Foods--Producers and Exporters--Mexico, 15 pp., Sept. 1965.

TRAWLERS:

"Insulating foams on trawlers," by J. J. Waterman, article, World Fishing, vol. 14, March 1965, pp. 52-53, printed. Grampian Press Ltd., The Tower, 229-243 Shepherd's Bush Rd., Hammersmith, London W6, England.

TROUT:

"How long are the trout fresh?" article, New Scientist, vol. 27, no. 461, Sept. 16, 1965, p. 688, printed, single copy 1s. 3d. (about US\$0.20). Cromwell House, Fulwood Pl., High Holborn, London WC1, England.

Some Migratory Habits of the Anadromous Dolly Varden, SALVELINUS MALMA (Walbaum) in Southeastern Alaska, by Robert H. Armstrong, Research Report 3, 36 pp., illus., processed, 1965. Department of Fish and Game, Subport Bldg., Juneau, Alaska 99801.

Untersuchungen zur Epidemiologie und Ökologie der Forellenseuche (Research on the Epidemiology and Ecology of Trout Diseases), by H. Liebmann and H. H. Reichenbach-Klinke, 20 pp., illus., printed in German with English summary. (Reprinted from Archiv für Fischereiwissenschaft, vol. 15, no. 2, Oct. 1964, pp. 94-113.) Bundesforschungsanstalt für Fischerei, Palmallee 9, Hamburg-Altona 1, Federal Republic of Germany.

TUNA:

"Individual'nyi impul'snyi apparat dlya lova tuntsa" (Individual pulsing apparatus for the capture of tuna), by I. F. Pisarevskii, article, Trudy Baltiskogo Nauch. Issled. Inst. Morsk. Rybn. Khoz. Okeanogr., vol. 9, 1962, pp. 160-161, printed in Russian. Four Continent Book Corp., 156 Fifth Ave., New York, N. Y. 10010.

"Oceanography and the ecology of tunas," by Maurice Blackburn, article, Oceanography and Marine Biology: an Annual Review, vol. 3, pp. 299-322, printed, 1965. George Allen and Unwin, Ltd., 40 Museum St., London WC1, England.

"Pêche et biologie du germon" (The fishery and biology of the albacore tuna), by Edouard Priol, article, France Pêche, no. 98, Sept. 1965, pp. 45-48, illus., printed in French, single copy 2.5 F. (about US\$0.50). France Pêche, Boite Postale 179, Lorient, France.

TURKEY:

Balık ve Balıkçılık (Fish and Fishery), vol. 13, no. 8, Aug. 1965, 32 pp., printed in Turkish with English table of contents. Et ve Balık Kurumu G. M., Balıkçılık, Mudurlugu, Besiktas, Istanbul, Turkey. Contains articles on: "Most valuable raw material of perfume industry, ambergris," by Emekli Koramiral; and "Technological developments in the field of fish flour (Part V)," by Hikmet Akgunes.

Market Factors in Turkey, by Donald R. Trafton, OBR 65-63, 12 pp., printed, Aug. 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

UNDERWATER PHOTOGRAPHY:

"Attempts to take photographs underwater," by O. F. Khludova, article, Trudy Okeanograficheskoi Komissii, vol. 14, 1962, pp. 30-38, printed in Russian. Akademiia Nauk SSSR, Moscow, U.S.S.R.

UNITED KINGDOM:

Fisheries of Scotland Report for 1964, Cmnd. 2644, 140 pp., printed, July 1965, 9s. 6d. (about US\$1.35). Department of Agriculture and Fisheries for Scotland, Edinburgh, Scotland. (For sale by Sales Section, British Information Services, 845 Third Ave., New York, N. Y. 10022.) Discusses highlights of the Scottish fisheries in 1964, means of capture and persons engaged in the fisheries, herring fishery, white fish fishery, shellfish fishery, industrial products, enforcement of fishery regulations, salmon fisheries, fisheries research, and harbor facilities. Appendices include information on herring distribution and disposal of landings, herring landings by area, herring methods of capture, white fish landings, salmon fisheries seasons and landings, Report of the Director of Fisheries Research, research by the Scottish Marine Biological Association, construction and improvement of harbors, and fisheries administration. Also contains statistical tables showing persons employed in the Scottish fisheries; production of fishery byproducts; landings of herring by British vessels; quantity and average price of demersal fish by species; quantity and value of fish landed by foreign vessels; and other related data.

U.S.S.R.:

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WEST AFRICA:

"Cold storage for West Africa," article, Fishing News International, vol. 4, no. 3, July-Sept. 1965, pp. 308-309, illus., printed, single copy 6s. 6d. (about US\$0.95). Arthur J. Heighway Publications Ltd., Ludgate House, 110 Fleet St., London EC4, England. Tells how, to meet the needs of local and international markets, a chain of refrigeration installations was built along the West African coast. In 1956 an active fisheries center was started in Dakar, Senegal, when the fishing fleets started to organize in all ports capable of providing facilities. From then until 1962 expansion proceeded along progressive lines, following the independence of all the former British or French West African colonies. Other countries also began to take part.

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"How the scientist helps the fisherman: unchecked exploitation," by D. E. Gaskin, article, Commercial Fishing, vol. 3, no. 12, Aug. 1965, pp. 25, 27, 29, illus., printed. Trade Publications Ltd., 26 Albert St., Auckland, New Zealand. Discusses the rapid decline of the world whaling industry, underlining the basic and urgent need for rational fisheries to be established in every part of the world.

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SEA ANIMALS SHOW RESISTANCE TO DISEASE

Fish and other creatures of the sea seem to have fewer infections and fewer cancers than land animals.

In a study of how primitive animals manage to cope with infectious diseases, 200 fish are under careful observation for the Variety Children's Research Foundation, a nonprofit organization conducting research in children's diseases.

Fifty sharks and 150 other varieties of fish swim around in large tanks and are readily identified by colored nylon tags, harmlessly attached to the cartilage of their dorsal fins.

The continuing program is being conducted by Dr. Michael Sigel and Dr. L. William Clem, at the Lerner Marine Laboratory near Miami, Fla. (Science News Letter, November 7, 1964.)

ANTARCTIC SEAL "LANGUAGE" STUDIED AND RECORDED IN UNDERWATER CHAMBER

United States scientists have used a unique new observatory--a chamber suspended in frigid Antarctic waters beneath 5 feet of solid ice--in an effort to learn the meaning of the clamor of seal voices that fills the dark ice-covered seas surrounding the south polar continent.

Biologists from the Woods Hole Oceanographic Institution and the New York Zoological Society cooperated in the project, which was funded by a grant from the National Science Foundation as part of the U. S. Antarctic Research Program.

Late in 1964, the biologists took turns over a 2-week period sitting alone in the 6-foot-high and 4-foot-wide steel capsule. Observers entered through a "chimney" extending to the surface, and viewed through six windows encircling the chamber. They listened to sounds piped in from hydrophones in the water outside. The range of the hydrophones was more than 5 miles, and the observers could hear hundreds of seals they could not see. (Floodlights attached to the chamber provided visibility for only a little over 200 feet.)

The chamber hung 7 feet below the ice in a 1,000-foot-deep area of McMurdo Sound.

Observers stated that the noises they heard were most closely described as whistles, buzzes, beeps, and chirps, and often sounded like something unearthly.

The animal responsible for the noises was the Weddell seal, an Antarctic species that grows up to about 11 feet in length and 1,300 pounds in weight.

"I've never heard such an underwater racket before," commented one authority on whale and seal sounds. "The Weddell surpasses all other seals that have been studied in the variety, amount, and power of the sound it produces, and in this ability is equalled among marine mammals only by some toothed whales."

The hydrophone arrangement made it possible to calculate the depth at which each sound was made. The zoologists explained that this is important because Weddells hunt for fish at considerable depths in total darkness, and are likely to use any possible sonar talent there.

Observers in the chamber reported that they saw few fish, but that a strikingly colored jellyfish with an umbrella 4 feet across and tentacles 30 feet long once floated by.

One of the leaders of the project said, "All the sounds we hear undoubtedly serve one or more purposes. Perhaps the Weddells use them for communication and, as with bats and whales, for sonar navigation. Sonar would explain how they find food and breathing holes, especially in the total darkness of the long Antarctic winter night.

"We will carefully analyze this jumble of sounds, together with our field observations, in the laboratory for clues to the 'language.' The sound tracks must be analyzed with instruments for full understanding, because seal voices have many characteristics that humans cannot hear, such as very high frequencies and rapid pulses too close together to distinguish. This process will take several months, and the conclusions must be proven by experiments with captive seals."

He added that the investigators will also try to figure out how the seals make the weird sounds. Weddells keep their mouths and nostrils shut tight underwater.

A SCUBA diving team provided supplementary observations and photographs. The divers could hardly hear the seals during their SCUBA explorations, but while in the chamber learned to associate certain throat and head movements with particular sounds. When diving they could "lip read" the sounds for their notes on behavior.

Antarctica is particularly suited to investigations of seal behavior because of the clarity of the water and the low level of noise from other sources. Facts learned about Antarctic seals may possibly apply to species in other parts of the world. (National Science Foundation, November 30, 1964.)



HIGHLIGHTS IN THIS ISSUE (JANUARY 1966)



Features

NEW APPROACHES TO QUALITY CHANGES IN FRESH CHILLED DRESSED HALIBUT--

Comparison of objective and subjective methods for measuring quality differences in iced halibut (p. 1).

WADE SEINE CONSTRUCTION AND METHOD OF USE--

Description of the gear and how it is used (p. 8).

Trends in the United States Fisheries

TECHNICAL NOTE NO. 2--An inexpensive scallop cleaner built from spare parts--vacuum cleaner modified and converted into scallop cleaning machine (p. 12).

CENTRAL PACIFIC FISHERIES INVESTIGATIONS--Submarine tested in underwater research (p. 27).

FUR SEALS--Interior Department to issue new proposals for processing Alaska skins (p. 29).

INVENTION--New fishing tackle device patented (p. 39).

OCEANOGRAPHY--8-month expedition completed by R/V John Elliott Pillsbury (p. 44); new U. S. research vessel ready for delivery (p. 45).

OREGON--Willamette River spring chinook salmon returns for 1965 (p. 45).

WASHINGTON--Record salmon releases from hatcheries in Jan.-June 1965 (p. 52).

Reports on Foreign Fisheries

FOOD AND AGRICULTURE ORGANIZATION--World fish catch tops 50 million tons in 1964 (p. 55).

INTERNATIONAL COUNCIL FOR THE EXPLORATION OF THE SEA--Meets in Rome (p. 61).

NORDIC COUNTRIES--New fishing limits recommended by industry organizations (p. 65).

CANADA--New chart will feature detailed contour lines (p. 68); Newfoundland fisheries aided by new bait-holding units (p. 69).

EAST GERMANY--Deep-sea submarine operated by remote control developed (p. 74).

FRANCE--Promotional campaign urges increased fish consumption (p. 73).

JAPAN--Radar-buoy for tracking fishing gear at sea (p. 87); fish-finder for trawl gear developed (p. 87).

MOZAMBIQUE--Shrimp fishery shows promise (p. 89).

PAKISTAN--Status of frozen foods industry under second five year plan (p. 89).

U.S.S.R.--Increases shrimp fishing in Gulf of Alaska (p. 87); pair fishing increases herring catches (p. 95); fishing with lights and electricity to be expanded (p. 95).

UNITED ARAB REPUBLIC--1965 major developments in fishing industry (p. 96).

ALSO FISHERY NEWS FROM 20 OTHER COUNTRIES

Federal Actions Affecting Fisheries

PESTICIDE MONITORING PROGRAM--Approved by Federal Committee on Pest Control (p. 100).

FEDERAL SUPPLY SERVICE--New specifications for canned sardines, shrimp, and tuna (p. 101).

Plus

Market reports; industrial products; State actions affecting fisheries; reviews of recent fishery publications throughout the world.

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Fishes

COMMERCIAL FISHERIES REVIEW



VOL. 28, NO. 2

FEBRUARY 1966

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington, D.C.



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
G. A. Albano and H. Beasley, Assistant Editors

Address correspondence and requests to the: Chief, Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 North Fort Myer Drive, Room 510, Arlington, Va. 22209.

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5/31/68

CONTENTS

COVER: The M/V Kaho, exploratory fishing and gear research vessel used in Great Lakes trawling studies by the U. S. Bureau of Commercial Fisheries. Her home port is Saugatuck, Mich. Explorations in the Great Lakes have demonstrated that bottom trawling is an efficient method of harvesting unutilized species such as alewife and smelt which occur in great abundance in certain lakes. (See p. 1 this issue.)

Page		Page	
1	. . Trawl Cod-End Mesh Size Selectivity Toward Yellow Perch in Lake Erie, by Norman J. Reigle, Jr.		
6	. . Skipjack Tuna (<u>Katsuwonus pelamis</u>) Resources of the Trust Territory of the Pacific Islands, by Brian J. Rothschild		
	TRENDS AND DEVELOPMENTS:		TRENDS AND DEVELOPMENTS (Contd.):
	Fishing Vessel and Gear Developments:		California (Contd.):
9	. . Equipment Note No. 18--A Nekton Ring Net Sampler for Use Aboard Oceanographic Research Vessels, by J. B. Rivers	15	. . Marine Sport Fish Survey off South California Continued
	Alaska:	16	. . Cans--Shipments for Fishery Products, January-September 1965
12	. . Foreign Fishing Activity off Alaska, November 1965		Crab:
12	. . King Crab Fishery Trends, November 1965	16	. . Pacific Northwest Coastal Fishing Season Opened December 1, 1965
13	. . Trawl That Sorts Shrimp and Fish to be Tested		Federal Aid for Sport Fish and Wildlife Restoration:
	Alaska Fishery Investigations:	16	. . Interior Department Apportions Additional Funds for Fiscal Year 1966
13	. . Salmon Research		Fisheries Laboratory:
	California:	17	. . New Tropical Atlantic Biological Laboratory at Miami
13	. . Experimental Anchovy Fishery Approved		Great Lakes:
14	. . Abalone Observations and Growth Studies	17	. . Michigan's Plans for Rebuilding Sport and Commercial Fishery
15	. . Abundance of Dungeness Crab Surveyed Prior to Open Season		

Contents continued page II.

CONTENTS (CONTINUED)

Page	TRENDS AND DEVELOPMENTS (Contd.):	Page	TRENDS AND DEVELOPMENTS (Contd.):
	Great Lakes (Contd.):		Salmon:
18 ..	Michigan Receives Supply of Northwest Silver Salmon Eggs for Planting Program	35 ..	U. S. Pacific Coast Canned Stocks, December 1, 1965
	Great Lakes Fisheries Explorations and Gear Development:		South Atlantic Fisheries Explorations and Gear Development:
18 ..	Gear Research for Great Lakes and Inland Fisheries, November 1965	36 ..	Royal-Red Shrimp Grounds off Florida Coast Surveyed
	Great Lakes Fishery Investigations:		Texas:
19 ..	Biological Research and Sea Lamprey Control, November 1965	37 ..	Fishery Landings, 1964
	Gulf Fishery Investigations:		Tuna:
19 ..	Shrimp Distribution Studies	38 ..	U. S. Pacific Coast Albacore Fishing Season for 1965 Ends
	Hawaii:	39 ..	Record Size Albacore Caught off Hawaii
20 ..	Fishery Landings, 1964		U. S. Fishing Vessels:
	Industrial Fishery Products:	39 ..	Fisheries Loan Fund and Other Financial Aid for Vessels, October 1-December 31, 1965
20 ..	U. S. Fish Meal and Solubles:		U. S. Foreign Trade:
	Production and Imports, January-October 1965	40 ..	Imports of Canned Tuna in Brine Under Quota
	U. S. Fish Meal, Oil, and Solubles:		Washington:
21 ..	Production, October 1965	40 ..	Change Proposed in Legal Definition of Commercial Salmon Trolling Gear
21 ..	Production by Areas, November 1965	41 ..	Sport Salmon Fishermen Barred from Commercial Fishery
21 ..	U. S. Marine Oil Supply Situation and Foreign Trade, October 1964-September 1965 with Comparisons	41 ..	Landings of Fish and Shellfish, 1963-1964
21 ..	Swine Grow Faster When Fish Meal is Added to Diet		Wholesale Prices:
	Inland Fisheries Explorations and Gear Development:	42 ..	Edible Fish and Shellfish, December 1965
22 ..	Oahe Reservoir Trawling Studies		FOREIGN:
	Maine Sardines:		International:
23 ..	Canned Stocks, November 1, 1965		Codex Alimentarius Commission:
	Menhaden:	44 ..	Third Session Meets in Rome, October 19-29, 1965
23 ..	Review of U. S. Menhaden Industry, 1965		Nutrition:
	Michigan:	45 ..	Seventh International Congress of Nutrition to Meet in Hamburg
24 ..	New Station for Warm-Water Fish Research Planned		Cod:
	Nautical Charts:	45 ..	France Holds International Conference on Cod Industry
25 ..	Lists for Atlantic and Gulf Coastal Waters		European Trade Fairs:
	New York:	45 ..	American Fishery Products Promoted
25 ..	New Site to be Acquired for New York City Wholesale Fish Market		European Free Trade Association:
	North Atlantic:	46 ..	Industrial Tariffs Reduced Another 10 Percent
25 ..	Soviet Fishing Activity off Coast, December 1965		Fish Meal:
	North Pacific Fisheries Explorations and Gear Development:	46 ..	Production and Exports for Selected Countries, January-September 1965
26 ..	Hake and Anchovy Population Survey	47 ..	World Production, September 1965 with Comparisons
27 ..	Pelagic Fishing Gear Research		Marine Oils:
	Oceanography:	47 ..	World Production and Export Forecast for 1966 with Comparisons
29 ..	Marine Engineering Experiment Station Proposed by Southern New England Group		Food and Agriculture Organization:
29 ..	New Institute for Oceanography Set Up Within U. S. Department of Commerce	47 ..	Expansion in Fisheries Work Recommended at Conference
31 ..	Sea Spider Set in Atlantic to Serve as Stable Oceanographic Buoy	47 ..	Cuban Proposal on Fishing Rejected at Conference
32 ..	Boundary Between Arctic and North Atlantic Oceans Surveyed by U. S. Coast Guard Cutter <u>Evergreen</u>		Great Lakes:
	Oregon:	48 ..	Fishery Problems in the Great Lakes
32 ..	Changes in Fishery Regulations Adopted by Fish Commission		Oceanography:
33 ..	New Salmon Fishway Completed for Columbia River System	49 ..	Biological Oceanographic Section Set Up within the International Union of Biological Sciences
34 ..	Landings of Fish and Shellfish, 1963-1964		Aden:
	Oysters:	50 ..	New Steel Purse-Seiner Leads the Way to Modernization
34 ..	Supplemental Feeding of Oysters Tested		

Contents continued page III.

CONTENTS (CONTINUED)

Page		Page	
	FOREIGN (Contd.):		FOREIGN (Contd.):
	Argentina:		Japan (Contd.):
51 ..	Joint Japanese-Argentine Tuna Enterprise	63 ..	Canned Tuna Pack, 1964
	Australia:	63 ..	Firm to Market Chunk-Style Canned Tuna in Oil in Japan
51 ..	Fishery Export Trends, July-September 1965	63 ..	Tuna Packers and Exporters Fail to Negotiate New Export Agreement for Canned Tuna in Brine
	Brazil:	64 ..	Tuna Federation Launches Promotion on Canned Albacore Tuna in Oil
52 ..	Changes in Fisheries Code Proposed	64 ..	Skipjack Tuna Pole-and-Line Fishing in Eastern Atlantic Reported Excellent
52 ..	National Commission for Oceanography Established	64 ..	Large Number of Atlantic Tuna Vessels Return
	Bulgaria:	65 ..	Tuna Bait Production Trends
52 ..	Trawlers to be Built for Domestic and Soviet Fisheries	65 ..	Purse Seiner to Test Fish for Tuna in Caroline Islands Waters
	Canada:	65 ..	New Tuna Trolling Gear Developed
52 ..	Federal Government to Assist Fishermen for Catch Failure	66 ..	Tuna Fishing Company Tries to Cut Labor Costs
53 ..	Federal Department of Fisheries Sets up New Conservation and Protection Service	66 ..	Crab Meat Exports, October 1965
53 ..	Government Sponsors New Community Fish Processing Centers in Newfoundland	66 ..	Exports of Canned King Crab to U. S. Decline
53 ..	Atlantic Offshore Fishing Vessel Conference	66 ..	Canned Shrimp Exports, October 1965
54 ..	British Columbia Canned Salmon Pack, 1960-1965	67 ..	Frozen Swordfish Export Validations to the U. S. and Canada, April-October 1965
54 ..	Amendment of Licensing System for Commercial Fisheries in British Columbia Planned	67 ..	Exports of Frozen Rainbow Trout, October 1965
55 ..	British Columbia Herring Fishery Labor Dispute Settled	67 ..	Exports of Marine Products, July 1965
55 ..	Ontario's Fishery Research Program on Lake Erie	68 ..	Firm to Import Shrimp from Thailand
56 ..	Industrial Products Production, Use, and Foreign Trade, August 1964-July 1965 with Comparisons	68 ..	Fishery Landings in Selected Areas, June 1965
	Colombia:	68 ..	Landings and Utilization of Fishery and Other Marine Products, April 1965
56 ..	Japan-Colombia Joint Tuna Enterprise Proposed	69 ..	Japanese Views on Fisheries Agreement with South Korea
	Denmark:	70 ..	Proposed Technical Cooperation Agreement with Soviets
56 ..	Exports of Fishery Products and Byproducts, January-September 1965	71 ..	Major Firms Plan Expansion of Minced Fish Operation
	Ecuador:	71 ..	Industrial Products Production, Use, and Foreign Trade 1964-1965 and Forecast 1966
57 ..	Japan-Ecuador Tuna Enterprise Planned	72 ..	Fisheries Agency to Ask Tighter Regulation of Cultured Pearl Industry
58 ..	Fishing Fleet Status, 1964	73 ..	Composition of Distant Water Tuna Fleet
	France:	73 ..	Tuna Federation Charters Oil Tanker to Refuel Vessels at Sea
58 ..	Tuna Ex-Vessel Prices and Import Quotas Set for West African 1965/1966 Season	73 ..	Applications for Distant-Water Trawl Fishery
	East Germany:	73 ..	Firm Purchases Cargo Vessel for King Crab Factoryship
59 ..	Atlantik-Class Freezer Trawlers Being Built for U.S.S.R.	74 ..	Whaling Operations Affected by Labor Dispute
	Greenland:		Republic of Korea:
59 ..	Salmon Fishery Trends, January-November 1965	74 ..	Five Tuna Vessels Ordered from West Germany
	Iceland:		Mauritania:
60 ..	Export Stocks of Principal Fishery Products, October 31, 1965	74 ..	Fish-Processing Complex to be Built by Spain
60 ..	Herring Landings and Export Trends, Late 1965		Morocco:
	Japan:	75 ..	Tuna Fishery Expansion Tried
61 ..	Frozen Tuna Exports to U. S. and Puerto Rico, October 1965	75 ..	Tangier Cannery Short of Raw Tuna for Canning
61 ..	Export Validations of Fresh and Frozen Tuna and Tuna Lions, April-October 1965	76 ..	Lobster Fishery Investment Opportunity
62 ..	Tuna Market Trends, December 1965	76 ..	Export Markets Sought for Fish Protein Concentrate
62 ..	Frozen Tuna Export Price Trends, November 1965		Netherlands West Indies:
62 ..	Government and Tuna Industry Hold Fifth Meeting	76 ..	Fisheries Trends as of June 1965

Contents continued page IV.

CONTENTS (CONTINUED)

Page		Page	
	FOREIGN (Contd.):		FOREIGN (Contd.):
	New Zealand:		Japan (Contd.):
77 ..	Spiny Lobster Production, January-April 1965	84 ..	Antarctic Whaling Plans for 1965/66 Season
	Nigeria:		United Arab Republic:
78 ..	Frozen Fish Landings by Foreign Trawlers Increase	84 ..	Soviet-Egyptian Fishing Agreement Signed
	Norway:		United Kingdom:
78 ..	Export Sales of Frozen Fish by Cooperative Group at Record Level	84 ..	Shrimp Fishing Venture in Persian Gulf Supported by Mothership
79 ..	Canned Fish Exports, January 1-July 24, 1965	85 ..	Plaice Rearing Experiment Points Up Problems of Marine Fish Farming
79 ..	Whale Oil Output During 1965/66 Antarctic Season Sold in Advance	85 ..	Freezer-Trawler <u>Othello</u> Launched for Hull Firm
	Peru:		FEDERAL ACTIONS:
79 ..	Fish Meal Industry Trends, November-December 1965		Department of Commerce:
	Philippine Republic:		Economic Development Administration:
79 ..	Fish Farm Development Program to be Financed by Australian Group	87 ..	Federal Funds to Aid Lake Superior Commercial Fishing Industry
	Rumania:	87 ..	Study Approved to Help Expand Louisiana Crayfish Industry
80 ..	Atlantic Trawling Operations Shifted to West African Coast		Department of the Interior:
	South Africa Republic:		Commercial Fisheries Research and Development Act:
80 ..	Fisheries Trends, August-September 1965	88 ..	Federal Aid Authorized for Hurricane Damage to Louisiana Oyster Fishery
80 ..	Foreign Fishing Operations off West Coast, November 1965		Fish and Wildlife Service:
81 ..	Spiny Lobster Transport <u>Gillian Gaggins</u> Delivered for Fishery in Tristan da Cunha Islands		Bureau of Commercial Fisheries:
81 ..	Fisheries Exhibition in October 1966 Planned	88 ..	Revised U. S. Standards for Frozen Raw Breaded Shrimp--Requirements for Condition of Coating Still Being Evaluated
	Republic of Togo:	89 ..	Applications for Fishing Vessel Loans
82 ..	Fisheries Trends, 1964-65	89 ..	Hearings on Applications for Fishing Vessel Construction Differential Subsidy
	Tunisia:		U. S. Tariff Commission:
82 ..	Fisheries Development Aided by Swedish Loans	90 ..	Comments Invited on Import Duties for Canned Clams
	U.S.S.R.:	90 ..	Eighty-Ninth Congress (Second Session)
83 ..	Soviets Plan 50-Percent Increase in Fishery Landings by 1970		RECENT FISHERY PUBLICATIONS:
83 ..	Freezer-Trawler <u>Zapoljarnyj</u> Delivered to Soviets by Danish Shipyard	92 ..	Fish and Wildlife Service Publications
84 ..	Japan Launches Fifth in Series of Factory-ships for Soviets	94 ..	Miscellaneous Publications



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TRAWL COD-END MESH SIZE SELECTIVITY TOWARD YELLOW PERCH IN LAKE ERIE

By Norman J. Reigle, Jr.*

ABSTRACT

Rapid decline of the more popular food fish from the Great Lakes has prompted the introduction and use of gear designed for more efficient, economical, and year-round methods of harvest. Yellow perch, now one of the most valuable food fish of the Great Lakes, can be caught by the bottom trawl at certain times and localities.

In some Great Lakes states fishermen are allowed to harvest yellow perch with trawls. Other states do not permit trawling for yellow perch partially because of lack of knowledge concerning the biological effects of trawling on yellow perch stocks. This study sheds some light on the problem of protecting sublegal-sized perch through trawl cod-end mesh size control. An analysis of data collected by the U. S. Bureau of Commercial Fisheries research vessel Kaho during two cruises in Lake Erie in 1962 and 1963 indicates a cod-end mesh size of 24 inches stretched measure is satisfactory for the efficient harvest of yellow perch. With this size mesh only 19 percent (by number) of all yellow perch caught were under 8 inches (total length) and a profitable catch rate of larger fish was maintained.

INTRODUCTION

Due to the recent decline in stocks of the more popular food fish, i.e., yellow pike or walleye, blue pike, lake trout, and whitefish, in the Great Lakes, the value and demand for yellow perch (Perca flavescens Mitchell) have increased. Before the choice species declined, practically all fishing was done with gill nets, trap nets, pound nets, and haul seines. When fish were plentiful those gear produced periodic market gluts and low prices.

Recent efforts to improve the competitive and economic status of the fishing industry have included improvements in catching methods, processing equipment, cold-storage techniques, and consumer education. The extension and stabilization of production seasons and reduction of production costs are of equal importance in this endeavor. During the course of routine U. S. Bureau of Commercial Fisheries exploratory fishing activities and the development of new animal food fisheries, it has become obvious that the otter trawl is effective not only in taking of alewife, chub, and smelt, but also at certain times and places is of considerable value in catching yellow perch.

To understand the benefits and disadvantages of otter trawling in the Great Lakes,

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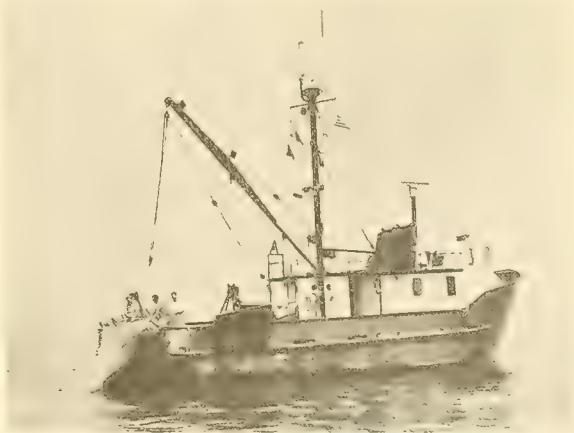


Fig. 1 - "Trousler leg" cod end being taken aboard the R/V Kaho in Lake Erie.

careful studies by species, area, and net design are desired by scientists, conservationists, and commercial fishermen. Trawl-mesh selectivity studies are an important step in this direction.

The introduction of the trawl into the Great Lakes did not occur until the late 1950's, however, and very little has been accomplished or published about the influence of various trawl characteristics in taking fresh-water fish. Numerous variables affect catch rate and success of bottom trawls. A number of noteworthy studies of these factors have been conducted in the ocean fishery (Taylor 1953; Clark 1963). One of the factors involved is species and size selectivity of different cod-end mesh sizes. Ferguson and Regier (1963) determined most desirable cod-end mesh size to obtain a high percentage of select market-size smelt in Lake Erie.

There is currently no size limit on yellow perch in the waters of the Great Lakes in Ontario, New York, or Pennsylvania. Indiana and Ohio have a size limit of 8 inches, and Michigan's legal size is $8\frac{1}{2}$ inches. In Wisconsin the size limit is 8 inches except in Green Bay where it is $7\frac{1}{2}$ inches. The legal sizes in those states correspond closely to the practical market size, and therefore identify the need to determine cod-end mesh sizes that will effectively screen out most of the individuals under those sizes (i.e., under about 8 inches).

In 1962 and 1963 strong year-classes of yellow perch were present in Lake Erie (U. S. Fish and Wildlife Service 1964). Records were kept of the size distribution of yellow perch for all catches during 2 of the 3 cruises by the Bureau of Commercial Fisheries research vessel Kaho in Lake Erie in those years.

During the second cruise (R/V Kaho Cruise 4) from September 23 to October 10, 1962, 62 trawl drags were completed and during the third cruise (R/V Kaho Cruise 11) from May 22 to June 20, 1963, 113 drags were completed. Although specific yellow perch studies were not a primary objective of those cruises, a great deal of basic information was amassed and four days were devoted entirely to special studies of mesh selectivity on yellow perch.

METHODS

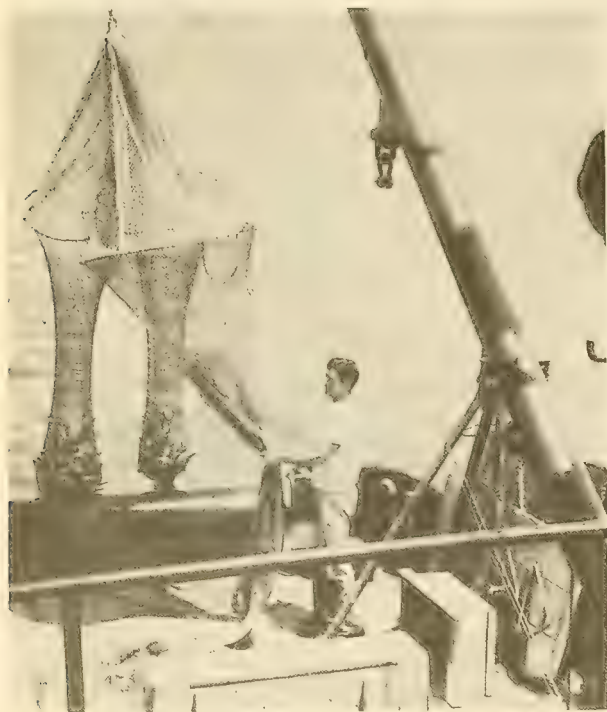


Fig. 2 - "Trouser leg" cod end with catch.

During R/V Kaho Cruise 4, two days (October 6-7, 1962) were devoted to studying the influence of three cod-end mesh sizes on size selectivity of yellow perch. For this purpose, a "trouser leg" cod end was used as a means of fishing two cod ends with different mesh sizes simultaneously on one net (figs. 2 and 3).

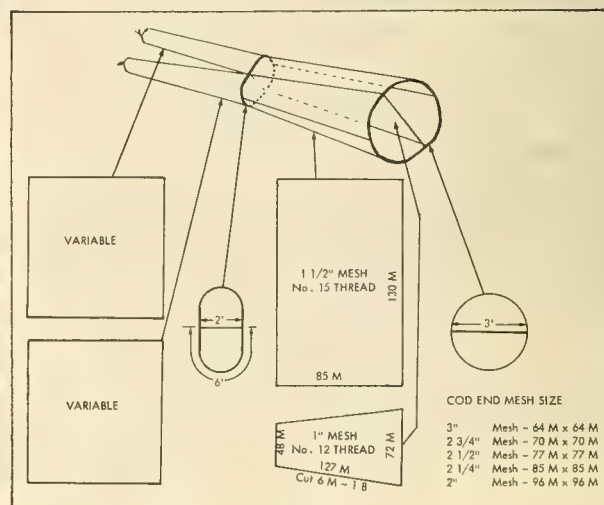


Fig. 3 - Construction of the "trouser leg" cod end. M=Mesh number.

The "trouser leg" was attached to a standard 52-foot (headrope) Gulf of Mexico-type fish trawl. Seven drags were completed; 3 comparing mesh sizes of $2\frac{1}{4}$ and $2\frac{3}{4}$ inches^{1/} (table 1). All drags were between Cleveland and Fairport, Ohio, at a depth of 13-14 fathoms.

On June 17 to 19, 1963, during R/V Kaho Cruise No. 11, size selectivity studies using the "trouser leg" cod end were continued off Avon Point, Ohio, at a depth of $10\frac{1}{2}$ to 11 fathoms. Four mesh sizes, 2, $2\frac{1}{4}$, $2\frac{1}{2}$, and 3 inches, were compared (table 2). On 2 drags, mesh sizes of 2 and $2\frac{1}{2}$ inches were paired; 2 drags paired mesh sizes of $2\frac{1}{4}$ and $2\frac{1}{2}$ inches; and 1 drag had mesh sizes of $2\frac{1}{2}$ and 3 inches paired. In addition, 3 drags were made in which both legs of the cod end were of $2\frac{1}{2}$ -inch mesh.

Table 1 - Summary of Yellow Perch Catches Taken in Paired Tows Using "Trouser Leg" Cod Ends during R/V Kaho Cruise 4

Number of Drags	Cod-End Mesh Size	30-Minute Drag	Fish		Percentage 8" or Longer
			Under 8"	Over 8"	
3	Inches $2\frac{1}{2}$ with $2\frac{3}{4}$	Lbs. 12	No. 14	No. 98	% 88
		5	2	45	96
4	$2\frac{1}{4}$ with $2\frac{3}{4}$	22	150	220	59
		9	15	91	86

Table 2 - Summary of Yellow Perch Catches Taken in Paired Tows Using "Trouser Leg"-Type Cod Ends during R/V Kaho Cruise 11

Number of Drags	Cod-End Mesh Size	30-Minute Drag	Fish		Percentage 8" or Longer
			Under 8"	Over 8"	
2	Inches 2 with $2\frac{1}{2}$	Lbs. 113	No. 69	No. 60	% 47
		62	28	138	83
2	$2\frac{1}{4}$ with $2\frac{1}{2}$	93	40	82	67
		55	30	84	74
3	$2\frac{1}{2}$ with $2\frac{1}{2}$	29	34	136	80
		65	37	138	79
1	$2\frac{1}{2}$ with 3	37	8	46	85
		6	-	11	100

In the 1962 studies, direction of drags was kept constant (west and WNW.). In 1963, the directions and alternate tows were reversed (north and south) with the exception of the $2\frac{1}{4}$ - and $2\frac{1}{2}$ -inch study where drags were N. and WNW. A constant engine speed of 1,100 r.p.m. produced a towing speed of about 3 m.p.h. With the exception of two drags of one-hour duration, all drags were 30 minutes long and all catch rates are equated to 30 minutes.

In addition to these special studies, the yellow perch taken with the standard assessment trawl (which used a one-inch mesh liner in the cod end) were

separated and placed into two size categories: (1) small--less than 8 inches, and (2) large--8 inches and over (figs. 4 and 5). Only data for drags which contained 10 pounds or more of



Fig. 4 - A sorted trawl catch taken in Lake Erie using a one-inch-mesh cod end. Legal-size (8-inch) yellow perch are in the tub in the left foreground and sublegal perch are in the tub on the right. In the box in the background is a bucket of smelt, a mixed lot of trout-perch and spottail shiners (center), two suckers, and young-of-the-year yellow perch (right).

^{1/}All cod ends were cotton material and premanufactured to the specific sizes. All measurements used in this report are stretched measure of the dry material.



Fig. 5 - Measuring yellow perch taken in selectivity studies.

yellow perch were considered for analysis. A total of 85 drags was made. Drags were made at depths ranging from 4 to 19 fathoms in the eastern, central, and western basins. All the 1962 drags used a standard 52-foot (headrope) trawl; while in the 1963 studies, 50-, 52-, and 61-foot trawls were used. All tows were of 30 minutes duration and vessel speed was about 3 m.p.h.

RESULTS

The results of the two-year study with a one-inch-mesh liner in the cod end are summarized in table 3. Although the proportionate distribution of drags in various basins were

Table 3 - Summary of Yellow Perch Selectivity Study Results Obtained on R/V <u>Kaho</u> Cruises 4 and 11 with One-Inch-Mesh Liner in Cod End					
Basin	Drags	Total Quantity	Per Drag	Fish 8" or Longer	Percentage 8" or Longer
	No.	Lbs.	Lbs.	Lbs.	%
Cruise 4 - (September 23 to October 10, 1962)					
Western . . .	6	1,785	298	1,103	61.8
Central . . .	14	3,921	280	387	9.9
Eastern . . .	1	10	10	1	10.0
Subtotal . .	21	5,716	272	1,491	26.1
Cruise 11 - (May 22 to June 20, 1963)					
Western . . .	17	1,950	115	205	10.5
Central . . .	42	5,984	142	1,927	32.4
Eastern . . .	5	185	37	11	6.0
Subtotal . .	64	8,083	126	2,143	26.5
Total . . .	85	13,769	162	3,634	26.4

similar for both years, over twice as many pounds of yellow perch per drag were obtained in 1962 than 1963. This decline agrees with the expectations shown by Lake Erie year-class strength data obtained by the Bureau's Biological Station at Sandusky, Ohio. Percentage of yellow perch longer than 8 inches was nearly identical in both years (26.1 percent in 1962 and 26.5 percent in 1963). The composite for both years was 162 pounds of yellow perch per drag of which 26.4 percent or 42 pounds were large fish

In the "trouser leg" cod-end studies the pounds of yellow perch per drag decreased from 113 to 6 in the range of

mesh sizes from 2 to 3 inches, and the catch of yellow perch over 8 inches increased from 47 percent to 100 percent over the same range (table 4). For comparisons of the "trouser leg"

mesh sizes from 2 to 3 inches, and the catch of yellow perch over 8 inches increased from 47 percent to 100 percent over the same range (table 4). For comparisons of the "trouser leg" and the one-inch mesh data, it should be remembered that the catch was divided in half in the "trouser leg" trawl, and thus catches should be doubled for making comparisons. The catch per unit of effort in the "trouser leg" studies may also have been influenced by distortion of the cod-end entrance caused by the heavier catch accumulated in the small-mesh leg of the cod end.

Table 4 - Summary of Yellow Perch Catches by the Varying from 2 Inches to 3 Inches					
Mesh Size	Drags Used	Per 30-Minute Drag	Fish		Percentage 8" or Longer
			Under 8"	Over 8"	
Inches	No.	Lbs.	. . . . (No.)		%
2	2	113	69	60	47
2 $\frac{1}{4}$	8	57	190	302	61
2 $\frac{1}{2}$	16	44	151	640	81
2 $\frac{3}{4}$	7	7	17	136	89
3	1	6	-	11	100

DISCUSSION

Trawl catch variables were controlled as much as possible and these studies demonstrated a direct relationship between mesh size and size of yellow perch caught. This difference can be clearly shown by the trend to catch larger yellow perch as mesh size increases (fig. 6). All yellow perch taken in the three-inch mesh were longer than 8 $\frac{1}{2}$ inches long; but in the two-inch mesh, only 36 percent were over 8 $\frac{1}{2}$ inches and 35 percent were less than 7 inches long. The selectivity is also reflected in the smaller total catch per unit of effort as the mesh size increased (fig. 7). Selectivity was identical for both years and seasons (spring and fall) in all mesh sizes for which comparative data was available.

A cod-end mesh size of one inch was too small for efficient selective harvest of marketable yellow perch, since only 26 percent of all yellow perch caught with that size mesh were 8 inches or longer. The larger mesh sizes were effective in eliminating small yellow perch and smaller fish such as smelt, alewife, and gizzard shad from the catch. Total catches of all drags with a cod-end mesh size of less than 2 inches had 42 percent by weight of species

other than yellow perch; while in mesh sizes of over 2 inches, only 17 percent of other species (mostly gizzard shad) were present.

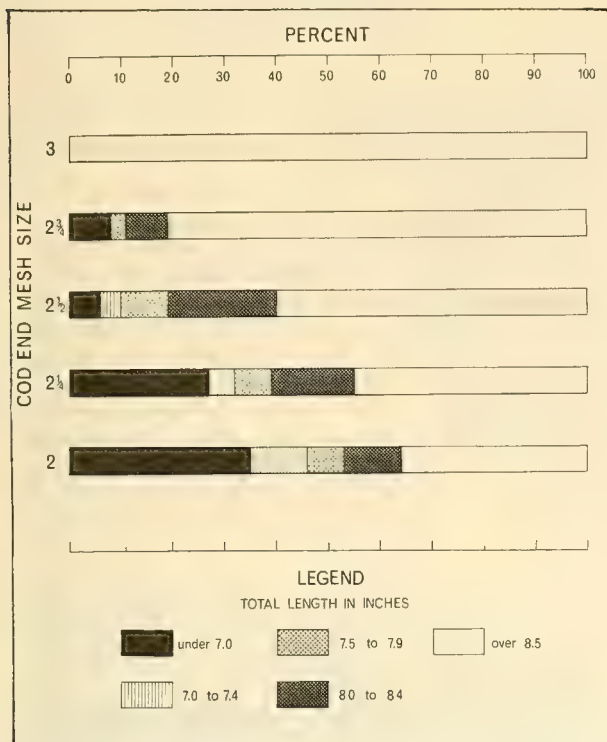


Fig. 6 - Size composition of yellow perch taken in various cod-end meshes. Percentage is based on total number of fish taken in all drags for each mesh size (stretched measure, inches).

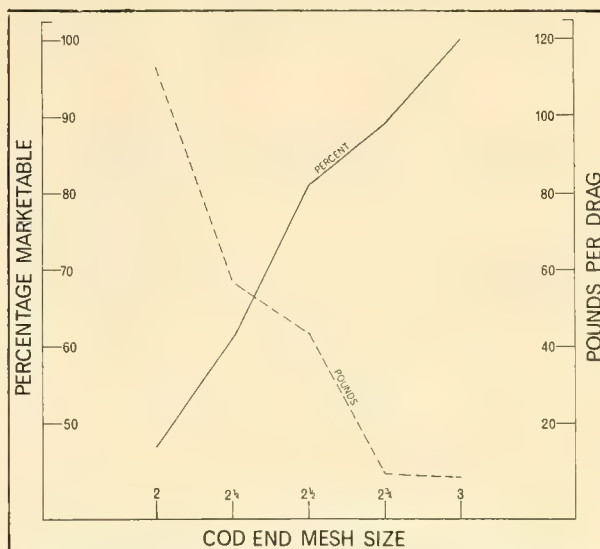


Fig. 7 - Percentage marketability (fish 8 inches and longer) and pounds of perch per thirty-minute drag for various mesh sizes. Catch-rate numbers represent only half of a divided catch in a "trouser leg" cod end.

Data from the present study indicates that the most efficient cod-end mesh size to harvest a high percentage of yellow perch 8-inches or longer, at a profitable catch rate, is 2½ inches. With that size mesh, 81 percent (by number) of all yellow perch taken were over 8 inches in length and a profitable catch rate was maintained.

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Created in 1849, the Department of the Interior—a department of conservation—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States—now and in the future.

SKIPJACK TUNA (*KATSUWONUS PELAMIS*) RESOURCES OF THE TRUST TERRITORY OF THE PACIFIC ISLANDS

By Brian J. Rothschild*

ABSTRACT

Prewar catches of skipjack tuna (*Katsuwonus pelamis*) in the Trust Territory of the Pacific Islands provide an index of potential harvests of this species from the Territory region. Data on prewar catches are presented along with a description of the recommencing tuna fisheries in the Palau Islands.

The Trust Territory of the Pacific Islands (fig. 1) has been under the trusteeship of the United States of America since July 18, 1947. It is a vast area of 3 million square miles dotted with the 2,100 islands of the Mariana, Palau, Yap, Truk, Ponape, and Marshall Islands Districts. The total land area of these islands is only 700 square miles. This large ocean-to-land ratio immediately suggests the present and potential importance of oceanic resources to the peoples of the Trust Territory.

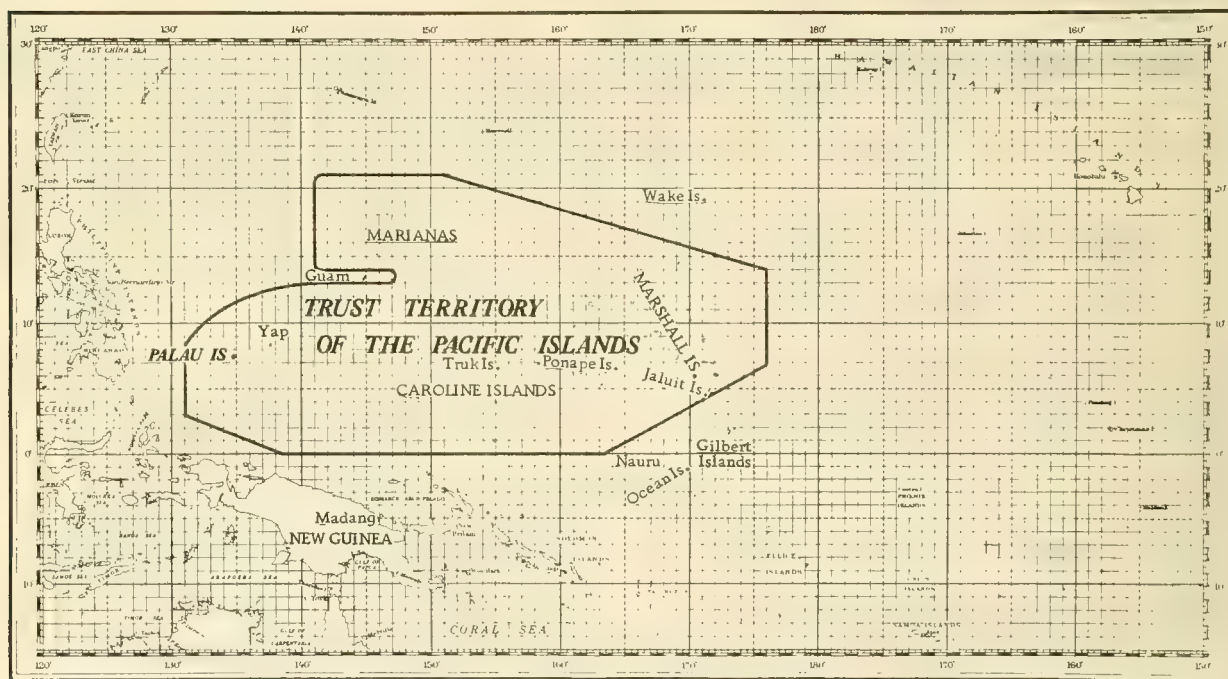


Fig. 1 - Trust Territory of the Pacific Islands.

HISTORICAL

Before the Second World War, the Trust Territory (then the Japanese-mandated islands) supported substantial fisheries for tuna which were not only taken in Trust Territory waters but also landed at its ports. The prewar fishery used pole-and-line gear for surface-swimming skipjack and long-line gear for the deep-swimming tuna, marlin, and shark. Commercial-scale tuna fishing was halted by the war. After the war long-line fishing was resumed, but the pole-and-line resources have not been harvested on a commercial scale until recently.

An index to the skipjack tuna potentials of the Trust Territory can be obtained from data on catches at maximum historical fishing intensities. Fishing intensity was highest prior to

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U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 753

the war by pole-and-line fishing. In 1937 the total Trust Territory catch of skipjack tuna was 33,000 metric tons; other annual catches between 1935 and 1940 ranged between 11,000 and 18,000 metric tons (see table).

CURRENT STATUS OF FISHERIES AT PALAU

At present the only fishery resource being actively developed by U. S. interests in the Trust Territory is a pole-and-line fishery for skipjack and small yellowfin at Palau.

Here, a Trust Territory management biologist is engaged in improving the type of boat used for the fishery (figs. 2 and 3) and an American company has begun a fisheries operation. A detailed discussion of fishery development in the Palau Islands may be found in Wilson (1965).

Skipjack Tuna Catch Landed in the Former Japanese-Mandated Islands, 1922-40.							
Year	Saipan	Yap	Palau	Truk	Ponape	Jaluit	Total
..... (Metric Tons)							
1940	3,379.05	3.64	6,047.38	7,217.09	1,586.30	0.51	18,233.97
1939	2,086.99	36.06	3,548.77	7,639.63	3,707.75	ND	17,019.20
1938	2,392.03	149.28	3,420.21	5,294.78	1,495.58	6.71	12,758.59
1937	2,697.30	ND	13,774.70	12,433.53	4,063.96	91.30	33,060.79
1936	1,696.01	ND	3,835.97	5,870.23	2,695.84	167.73	14,265.78
1935	1,785.98	ND	5,390.99	3,002.43	1,313.12	229.78	11,722.30
1934	2,516.00	4.19	3,778.65	1,199.98	1,202.46	255.13	8,956.41
1933	1,762.30	ND	2,144.46	1,883.36	926.85	172.43	6,889.40
1932	1,309.73	ND	1,592.33	810.26	534.18	614.76	4,861.26
1931	564.26	0.44	548.12	1,097.13	525.24	81.26	2,816.45
1930	258.00	0.90	157.06	913.39	6.38	ND	1,335.75
1929	24.69	0.89	228.90	214.50	0.53	ND	469.51
1928	26.49	1.13	131.45	4.50	0.15	ND	163.72
1927	28.11	0.73	14.77	7.50	1.62	0.22	52.95
1926	44.84	2.16	42.41	2.76	0.11	ND	92.28
1925	14.81	1.99	8.53	6.05	4.95	ND	36.33
1924	9.10	1.76	1.56	5.21	0.11	ND	17.74
1923	2.81	1.46	ND	3.04	ND	ND	7.31
1922	2.36	ND	ND	3.60	3.75	ND	9.71

ND: No data available.

Note: These data are taken from S. Shapiro's "The Japanese Tuna Fisheries," U.S. Fish and Wildlife Service Fishery Leaflet 297, 1948. Shapiro used the Statistical Yearbook of the South Sea Islands as a source.



Fig. 2 - A view of the Palau shipyard now operated by the Trust Territory government.



Fig. 3 - Interior view of Palau shipyard, showing keel members for a 75-foot Hawaiian-style tuna sampan being constructed under the direction of the Territory fishery management biologist.

Arrangements to begin the Palau Islands operation were made in 1963 when the Trust Territory administration signed an agreement with the Van Camp Sea Food Co., which enabled the company to locate a fleet and shoreside facility, including a 1,500-ton freezer-storage plant at Malakal Harbor in the Palau Islands (fig. 4). Actual fishing began in the summer of 1964 when the firm began receiving catches from six fishing vessels of the Okinawan type weighing 25 tons each. During the early months of the fishery, monthly catches of skipjack ranged between 200,000 and 750,000 pounds.

The vessels used in this fishery were built in Okinawa and are of a design typical of bait-fishing vessels used for tuna throughout the western Pacific Ocean (fig. 5). They are 65 feet long, not including the catwalk bow. The beam is 15 feet. Forward of the bridge are two baitwells, four ice holds, and a fish hold. Each baitwell can contain 30 buckets of bait. The vessels are powered with 6-cylinder, 90-horsepower engines and have a maximum speed of about 7 knots. Each vessel is manned by 12 skilled Okinawans and 8 Micronesian trainees. When



Fig. 4 - View of fishery facilities at Malakal Harbor, Palau. The buildings in the foreground are fishermen's quarters. The freezing plant is the large building in the left background. Three of the fishing vessels are tied up at the dock.



Fig. 5 - One of the tuna vessels based at Palau. Pole-and-line gear and live bait are used to catch surface schools of skipjack and yellowfin tuna.

the Micronesians become more adept at fishing, they will eventually replace the Okinawans.

Several bait species are used in the fishery. A small anchovy-like fish appears to be the most important. The bait is taken at night with the aid of a light to attract the fish. The bait fish are held in floating bait receivers, which consist of netting supported by bamboo frames. When the fishing vessel is ready to proceed from the bait area to the fishing ground, the bait is loaded in the baitwells. On the fishing ground, fish schools are sighted by scouting for bird flocks or floating logs, both indicators of the presence of tuna schools.

Plans are under way to expand the Palauan fleet. Several companies are considering the establishment of fishing bases at sites of other active prewar skipjack fisheries such as Truk.

Note: The cooperation of Peter T. Wilson and various other officials of the Government of the Trust Territory of the Pacific Islands is sincerely appreciated. John Liversey, Trust Territory Public Information Officer, kindly supplied figures 2, 3, 4, and 5.

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THREE WHALE HEARTS WITH A COMBINED WEIGHT OF 1,200 POUNDS DONATED TO SCIENCE

A firm in Chicago, Ill., is using whale hearts in a research project aimed at analyzing cytochrome c, one of many proteins found in every cell of the body.

The firm had previously worked on the hearts of a number of subjects, ranging from man to moths, but had never studied whale hearts. So company scientists asked a Norwegian whaling fleet operator if he would donate about 160 pounds of heart muscle from a whale. Instead, the Norwegian presented them with eight times that much—three entire whale hearts with a combined weight of more than 1,200 pounds.

The Norwegian whaler, it seems, has a big heart, too. (Oil, Paint, and Drug Reporter, August 2, 1965.)

TRENDS AND DEVELOPMENTS

Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 18--A NEKTON RING NET SAMPLER FOR USE ABOARD OCEANOGRAPHIC RESEARCH VESSELS:

Concerted efforts by marine scientists in the use and development of subsurface gear and techniques for sampling plankton while the research vessel is under way are of long standing. These efforts have not, however, solved the problem of sampling nekton in the surface layer of water from a moving vessel at sea. The valuable contribution that nekton provides to studies of marine resources has been recognized to the extent that routine sampling in the 1-meter surface layer has developed as an important phase of the exploratory fishing operation. Until recently, the primary tool used aboard exploratory fishing vessels to collect nekton specimens was the simple dip net. It was used when drifting during daytime or in conjunction with attraction lights when "laying to" at night and required the exclusive use of vessel time.

Described here is an effective, economical, and easily handled gear developed aboard the exploratory fishing vessels Silver Bay and Oregon of the U. S. Bureau of Commercial Fisheries for sampling nekton in the 1-meter surface layer of water from a moving vessel simultaneously with and without interference to other fishing activities.

The nekton ring net is designed to be used while the vessel is under way at reduced speed. It can be easily handled by one person with little or no interference with other shipboard activity. For this reason, except when the vessel is drifting or running at cruising speed, the nekton ring net may be operated round-the-clock.

The nekton ring net is essentially a circular net with a conical-shaped bag attached to a 1-meter-diameter steel ring and towed on a 3-leg bridle (fig. 1, see p. 10). The bag is constructed from four circular panels of con-

secutively graduating nylon netting of 2-; $\frac{1}{2}$ -; $\frac{1}{4}$ -; and $\frac{1}{16}$ -inch stretched mesh respectively. The steel meter ring is constructed of galvanized 1-inch-diameter stock and the 3-leg bridle is of $\frac{3}{16}$ -inch diameter, 3-strand, 1,050-



Fig. 2 - Pulling the retrieving line to bring the net to the side of the ship.

pound-test nylon rope. The bridle legs are 6 feet long, and each is spliced into a 3-inch (inside diameter) by $\frac{5}{16}$ -inch-stock-galvanized steel bridle tow ring. A $\frac{3}{16}$ -inch-diameter nylon tow line is attached to the bridle tow ring at one end and secured to a small boom extending out from the side of the vessel at the other end. Tow line length is var-

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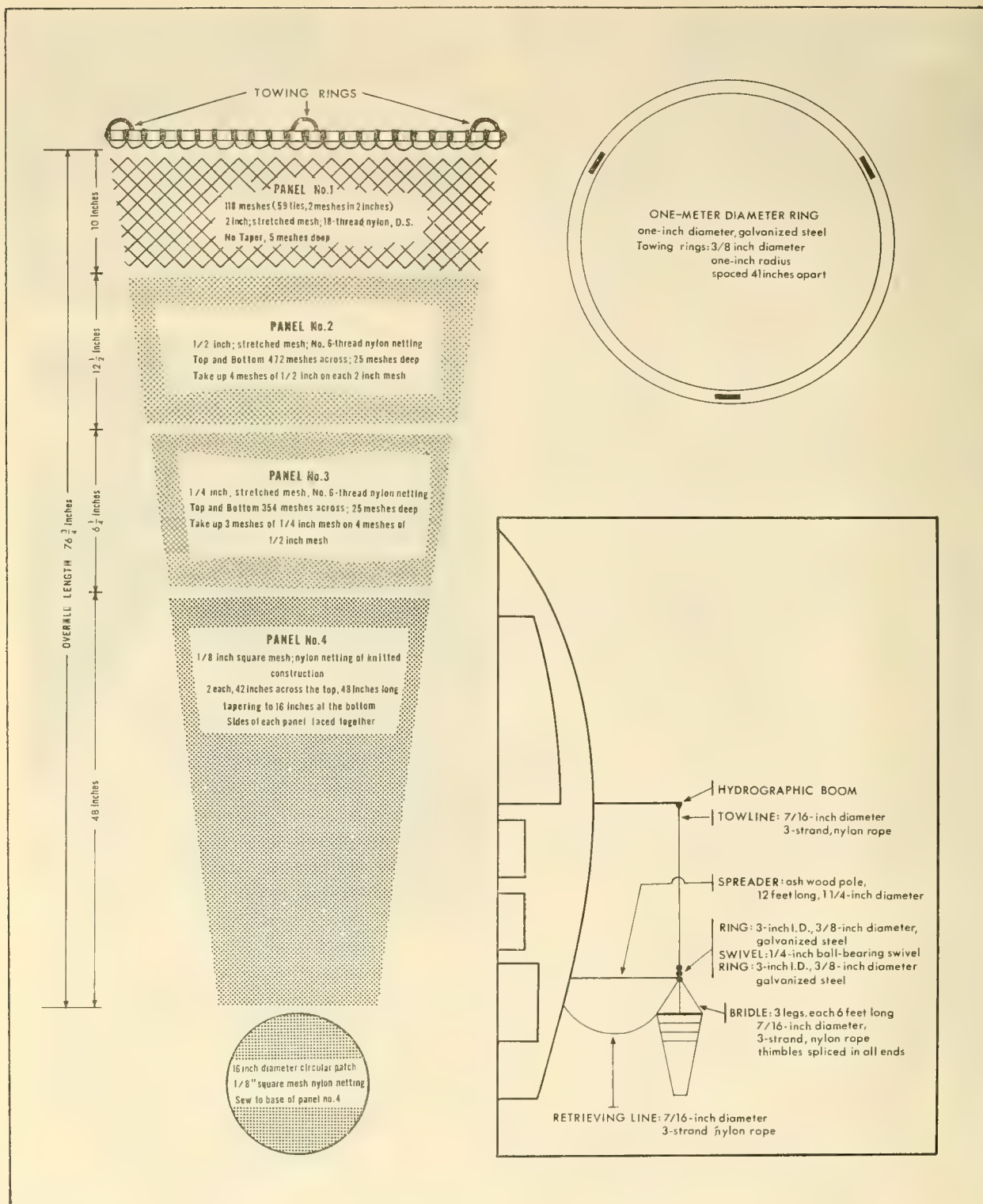


Fig. 1 - The specifications of the ring-net and associated gear.

iable depending upon boom height and vessel speed. Boom length is also variable, although a minimum of about six feet is needed to keep the net away from the side of the hull and out of wake turbulence. A $\frac{1}{4}$ -inch (900-pound breaking strength) ball-bearing swivel is attached at the junction between the bridle and towline to prevent excessive kinking. For ease in handling, a $\frac{3}{16}$ -inch nylon retrieving line is attached from the top inboard section of the meter ring to the vessel rail. Thus by pulling the retrieving line (fig. 2), strain is released from the bridle and transferred to the side of the meter ring, making retrieval a simple 1-man operation.

Towing speeds in excess of four knots, particularly in a following sea, may cause the net to skip along the surface or jump completely out of water. This can be remedied by attaching a 20-pound weight to the bottom of the meter ring, with little or no adverse effect on the catches. When additional weight and stability are desired, a length of galvanized steel chain weighing approximately seven pounds may be attached to the towline in front of the bridle ring.

To keep the net away from the hull when using a short hydrographic boom as on the Oregon, a 12-foot, $1\frac{1}{2}$ -inch-diameter ash spreader pole (fig. 3) may be used.



Fig. 3 - Nekton net in action, showing spreader pole keeping the net away from the vessel.

Care and observation of prevailing conditions such as towing speed, prevalence of sargassum weed, and presence of floating debris must be exercised to insure that quality specimens are obtained. Experience has shown that short tows (approximately 15 minutes long) and frequent retrieval tend to prevent damage to fragile specimens.

In the Gulf and South Atlantic operational area, the following groups have dominated the catches of the nekton ring net: Myctophidae, Xiphiidae, Istiophoridae, Pleuronectiformes, Synodontidae (larvae), Leptocephali, Excocitidae, Plectoganthus, Carangidae, Cory-



Fig. 4 - Typical components of the nekton taken in the nekton ring net.

phaenidae, and Hemirophidae. An example of the more spectacular catches occurred during Silver Bay Cruise 42 when a total of 113 Xiphiidae and 385 Istiophoridae were taken at five stations.

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--By J. B. Rivers,
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Exploratory Fishing and Gear Research Station,
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Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, NOVEMBER 1965:

U.S.S.R.: Early in November 1965, the fleet of about 70 Soviet vessels centered off southeast Alaska near Dixon Entrance was divided. About 50 of the Soviet vessels moved south and began fishing off central British Columbia in Queen Charlotte Sound north of Vancouver Island. They operated just outside Canada's newly established 12-mile fishing zone throughout most of November. Catches of the Soviet trawlers off Canada reportedly were composed of ocean perch, sole, and other bottomfish.



One type of Soviet factoryship operating in the North Pacific and Bering Sea. Length overall about 150 feet with a speed of 10-12 knots.

The remaining contingent of the Soviet fleet off southeastern Alaska continued to fish near Dixon Entrance and in mid-November the size of that fleet began increasing as vessels returned north from the Queen Charlotte Sound expedition. Also about mid-November the Soviet fleet off Dixon Entrance

began moving to the north. By month's end that fleet was operating on the Yakutat and Fairweather Grounds between Cape Spencer and Cape St. Elias, an area the Soviets fished heavily earlier in 1965. Following the apparent termination of the Queen Charlotte Sound expedition, the size of the Soviet fleet in the eastern Gulf of Alaska returned to about 70 vessels, including 55 trawlers (5 of which were BMRT factory trawlers), about 10 reefers, and a few support vessels.

Another Soviet fleet of about eight BMRT factory trawlers fished Portlock and Albatross Banks off Kodiak Island during most of November. Several of those vessels joined the fleet off Yakutat late in the month, leaving about five factory trawlers off Kodiak.

With the appearance of at least 10 BMRT factory trawlers in the Gulf of Alaska during November 1965, it was presumed that the Soviet fleet fishing for Pacific ocean perch in the central and western Aleutians was reduced to a total of about 15 factory trawlers, serviced intermittently by support vessels.

Increasing shrimp fishing efforts by the Soviets in the Gulf of Alaska during November 1965 involved at least eight SRT-M trawlers. During the latter part of the month the Soviet shrimp fleet was divided, with one group of four vessels moving to the proven shrimp fishing grounds east of the Trinity Islands off southwest Kodiak Island. The remaining four vessels continued operations east of the Shumagin Islands.

All three of the Soviet whaling fleets that had worked off Alaska reportedly returned to Vladivostok by early November, completing their 1965 North Pacific operations.

Japan: Within the Gulf of Alaska, four Japanese factory trawlers fished primarily on Albatross Bank during most of November. The only other Japanese vessels fishing off Alaska during the month were two factory trawlers and a large side trawler working along the western Aleutians between Semisopochnoi Island and the Near Islands.

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KING CRAB FISHERY TRENDS, NOVEMBER 1965:

The record number of king crab tag returns (about 300) received at Auke Bay during November 1965 indicated that fishing

pressure in the Kodiak Island area is probably increasing. The 1965 king crab catch was expected to reach an all-time high of about 100 million pounds.

To insure high standards for the quality of king crab and to promote markets for king crab, the State of Alaska in 1965 set up an Alaskan King Crab Marketing and Quality Control Board. The Board's program for 1965 included a \$50,000 contract for the promotion of king crab by an advertising agency in Seattle, Wash. Additionally, the Board has under study the work on king crab quality control being done by the Alaska Department of Health and Welfare, the U. S. Bureau of Commercial Fisheries, and the National Cannery Association.

* * * * *

TRAWL THAT SORTS SHRIMP AND FISH TO BE TESTED:

The U. S. Bureau of Commercial Fisheries exploratory Fishing and Gear Research Base at Juneau, Alaska, plans to build and test a 2-bag shrimp trawl. This shrimp trawl was first developed in France and was further modified in the Netherlands, according to the Dutch periodical *Visserij-Nieuws*. A unique feature of this trawl is an intermediate "sieve flap" which sorts out the shrimp from the fish catch. It seems that shrimp jump up on the water column when disturbed and leap through the large mesh sieve flap and into the small meshed upper cod end. Fish, on the other hand, are diverted by this sieve flap into the large-mesh lower cod end. The lower cod end can be closed or left open depending on whether a fish catch is desired. If it proves successful, such a trawl would aid Kodiak shrimp fishermen who have been plagued by excessive amounts of Alaska pollock in their catches.



Alaska Fishery Investigations

SALMON RESEARCH:

Following are brief notes on U. S. Bureau of Commercial Fisheries salmon studies in Alaska:

Compilation of Naknek Lake red salmon smolt data is showing that although age I and II smolts start migrating from the lake in May, the age II run is finished by late July,

while the age I outmigration continues into September and possibly later. Comparison of sizes suggests that in agreement with other red salmon races the fastest growing progeny from a given brood year in the Naknek system migrate as age I fish and the slower growing fish leave the following year at age II.

Data collected during hydraulic sampling of sockeye eggs in Grassy Point Creek were analyzed. Of the 7,096,000 eggs potentially available for deposition, an estimated 1,347,000 eggs (1,052,000 live and 295,000 dead eggs) were present in the gravel on October 8, 1965. Survival from potential to actual egg deposition was computed to be 15 percent. The comparable figure for 1964 was 11 percent. Spawner density and loss to bear predation were less in 1965 and probably accounted for the higher survival in 1965.



California

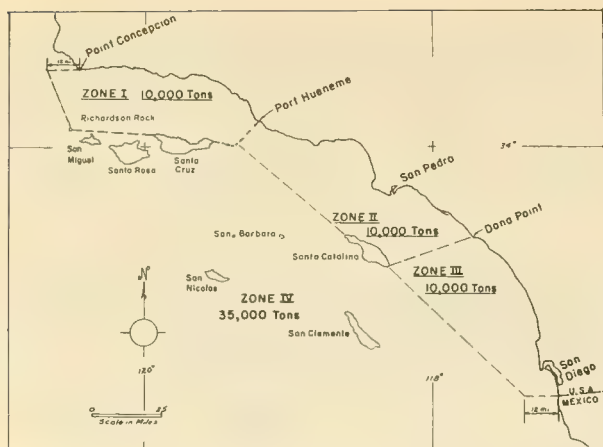
EXPERIMENTAL ANCHOVY FISHERY APPROVED:

In mid-November 1965, the California Fish and Game Commission approved regulations and permits for the controlled commercial catch in 1965/66 of not more than 75,000 tons of anchovies from California's offshore waters for reduction into fish meal, poultry feed, and other industrial products.

The maximum "take" of 75,000 tons will be cumulative for all permit holders in all prescribed areas through April 30, 1966, closing date of the authorized experimental season.

Commission regulations provide that the fishery may be terminated at any time the Commission finds that existing uses of anchovy--including live bait and forage uses--are jeopardized, or when the resource is clearly endangered.

Applications for California reduction permits were accepted through December 1, 1965. As of November 20, the Commission had authorized the granting of permits to 9 commercial applicants representing 12 reduction plants. Authorization on all permits, however, was conditioned upon the administrative approval of the California Department of Fish and Game.



Anchovy southern permit area.

In addition to the overall seasonal reduction limit of 75,000 tons of anchovies, the Commission regulations have established sub-limits within 5 defined "zones" in offshore waters.

All waters north of Point Concepcion are included in a single-zone Northern Permit Area with a catch limit of 10,000 tons of anchovies for reduction. All bays and established live-bait areas are closed to commercial anchovy fishing.

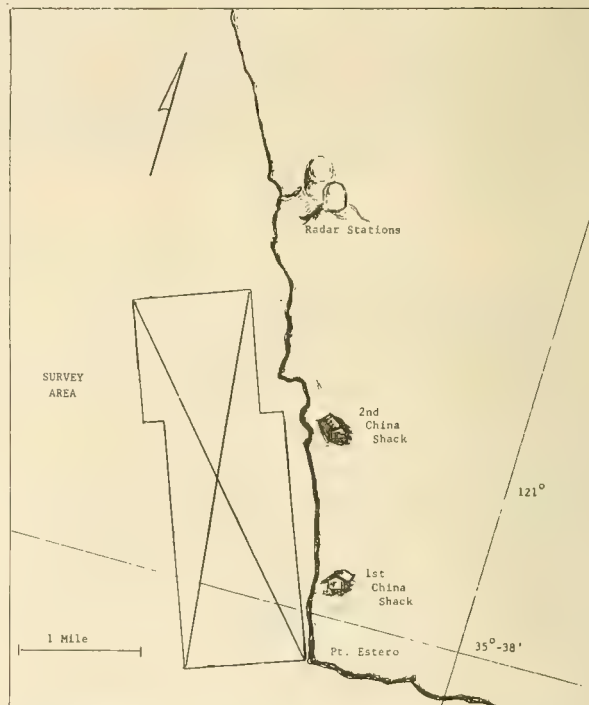
The Southern Permit Area has been subdivided into 4 zones, with an overall limit of 65,000 tons of anchovies. Three of those zones, with limits of 10,000 tons each, lie shoreward of an irregular line drawn from Point Concepcion to Richardson Rock, to Santa Cruz Island, to Anacapa Island, to Catalina Island, and south to a point 12 miles seaward of the California-Mexico international boundary. Zone divisions within that section are defined by lines drawn seaward from Port Hueneme and from Dana Point. Closed areas within those 3 zones include all waters lying within 3 miles of the mainland shoreline, and within 3 miles of the leeward (east) side of Catalina Island.

The fourth zone in the Southern Permit Area, bearing a 35,000-ton limit, encompasses all waters beyond the outer boundary of the 3 shoreward zones. (California Department of Fish and Game, November 20, 1965.)

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ABALONE OBSERVATIONS AND GROWTH STUDIES:

M/V "Mollusk" Cruise 65-M-2A-Abalone (September 13-27, 1965): The number and sizes of abalone in commercial fishing areas were estimated by random sampling methods during this cruise by the California Department of Fish and Game research vessel Mollusk. The coastal area from Pt. Estero to Cambria was where the vessel operated.



Survey area covered by M/V Mollusk Cruise 65-M-2A-Abalone, September 13-27, 1965.

During the cruise, 20 diving stations selected at random were occupied within two adjacent areas each $1 \times 1\frac{1}{2}$ miles. Three areas had been selected but adverse weather limited diving to 2 of the 3 areas. Station depths ranged from 20 to 66 feet. Dives averaged from 30 to 40 minutes for each station, covering a 1,500-square-foot area along a 290° transit line at each station (100 ft. long \times 15 ft. wide). All abalone that could be found within each station area were counted and measured.

Weather conditions were not good for diving, and a large swell and dirty water at the stations restricted observations in shallow water. Several dives were necessary at some stations before counts could be made. Ab-

lone were found on all but 7 of the 20 stations completed. Abalone may have been present at 2 other stations but because of a heavy swell and large amounts of sediment, observation was restricted.

The remaining 11 negative dives were over rocky areas in deep water where the bottom was predominantly sandy. Greatest concentrations were found in 40- to 60-foot depths. The greatest numbers of abalone found were in the 4- to 7 $\frac{3}{4}$ -inch size group. About 50 percent more of that size group was found than in the survey made in December 1964. But 30 percent fewer of the 0- to 4-inch group and 20 percent fewer of 7 $\frac{3}{4}$ -inch and larger abalone were found than in the 1964 survey.

Note: See Commercial Fisheries Review, March 1965 p. 25.

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ABUNDANCE OF DUNGENESS CRAB SURVEYED PRIOR TO OPEN SEASON:

M/V "Nautilus" Cruise 65-N-2g (October 4-29, 1965): To determine pre-season abundance and condition of legal and sublegal Dungeness crab (*Cancer magister*) in the San Francisco area for prediction of the 1965/66 season, the coastal waters off San Francisco from the Russian River to Point Montara were surveyed by the research vessel Nautilus of the California Department of Fish and Game. Another objective was to collect female crabs for fecundity and fertility studies.

Sampling stations during this cruise were selected randomly from the crab areas between Point Montara and the Russian River. Commercial crab traps were baited with squid and rockfish and allowed to fish overnight at each of the 70 stations visited. Ten of the stations were fished for 2 days due to vessel difficulties.

A total of 6,193 crabs was taken at 70 stations in 697 traps. The catch consisted of 2,521 legal males, 3,443 sublegal males, and 229 females. The average legal catch per trap of 3.62 crabs was higher than the 1964 catch of 2.78 but lower than the 1963 catch of 4.3.

California Preseason Survey Catches and Predictions for Dungeness Crabs				
Season	Legals	Sublegals	Predicted Catch	Actual Seasonal Landings
	No. / Trap	No. / Trap	Million Lbs.	Lbs.
1965/66	3.6	4.9	0.8-1.4	-
1964/65	2.8	2.1	0.6-0.9	787,619
1963/64	4.3	2.9	1.1-1.6	1,158,157
1962/63	4.1	3.5	0.7-1.6	1,429,780
1961/62	3.2	5.1	1.5	710,350

The best catches (numbers of legal crabs per trap) in 1965 were made from Bodega Bay to the Russian River in 10-22 fathoms of water. Good catches were also made south of the San Francisco Lightship in 15-25 fathoms of water. On the basis of the survey, it was believed the catch for the 1965/66 season would be 1.1 million pounds, with estimates ranging from 800,000 to 1.4 million pounds.

The average sublegal catch of 4.9 during the 1965/66 pre-season survey was the highest since 1961/62 but does not indicate a strong population according to past pre-season surveys. In 1962, after the survey showed 5.1 sublegals per trap, 1,429,780 pounds were landed--far below the long-term average of 3.8 million pounds.

The crabs caught in 1965 were in good condition with only 5 percent soft, but many of the crabs in the San Francisco area were barnacled and had missing legs. At Bodega Bay the crabs were of excellent quality and good size. Fifteen females with eggs were collected for fecundity studies.

Note: See Commercial Fisheries Review, March 1965 p. 24.

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MARINE SPORT FISH SURVEY OFF SOUTH CALIFORNIA CONTINUED:

Airplane Survey Flight 65-14 (October 7 and 13, 1965): Two separate one-day flights were made in October 1965 as part of a marine sport fish survey to count the number of fishing poles being fished from the shoreline, and if possible, the number of people attending them. The southern California coastline from the Mexican Border to Jalama Beach State Park was the area surveyed by the aircraft Cessna "182" N9042T of the California Department of Fish and Game.

The counts will be used to augment estimates of sportfishing effort derived from the ground survey. The aerial counts provide data for (1) an independent estimate of total effort, and (2) the calculation of a conversion factor to be used in deriving estimates of effort in those areas not covered by the ground crews.

The coastline from the Mexican Border north to Santa Monica was surveyed for about 1 $\frac{1}{2}$ hours on the afternoon of October 7. The flight was terminated at Santa Monica because of low coastal fog. A total of 40 poles

attended by 40 fishermen was counted. Fishermen were well scattered in the area surveyed. The only notable concentration was in the Point Fermin-White Point area where 9 fishermen (22.5 percent) were observed.

On October 13 the coastline was flown in a little more than two hours from the Mexican Border north to Santa Barbara Harbor. Low coastal fog and haze prevented continuing beyond that point. The count was 56 poles and 55 fishermen. Almost 9 percent of the total (5 poles) were being fished outside of the area encompassed by the regular shoreline sampling plan. Fishermen were fairly well scattered except from La Costa State Beach to Oceanside where 11 fishermen (20 percent) were counted.

The flights further substantiated the fact that about 10 percent of the observed fishing activity in southern California was taking place outside the area encompassed by the preselected shoreline sampling plan.

Note: See Commercial Fisheries Review, December 1965 p. 22.



Cans--Shipments for Fishery Products, January-September 1965

A total of 2,324,148 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-September 1965 as compared with 2,215,974 base boxes used during the same period in 1964. In 1965, an increase in the U. S. canned pack of Maine sardines and Gulf shrimp was offset somewhat by some decline in the pack of canned tuna.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.



Crab

PACIFIC NORTHWEST COASTAL FISHING SEASON OPENED DECEMBER 1, 1965:

The coastal commercial Dungeness crab fishing season in Oregon and Washington o-

pened December 1, 1965. The Washington fishery had been originally set to open a month later, but was rescheduled to coincide with the Oregon fishery. (Washington Department of Fisheries, November 23, 1965.)



Federal Aid for Sport Fish and Wildlife Restoration

INTERIOR DEPARTMENT
APPORTIONS ADDITIONAL FUNDS
FOR FISCAL YEAR 1966:

Distribution of more than \$11 million in Federal-aid funds for fish and wildlife restoration projects in the 50 States, Guam, the Virgin Islands, and the Commonwealth of Puerto Rico was made about the latter part of 1965, announced Secretary of the Interior Stewart L. Udall December 15, 1965. The distribution supplements \$15 million released on June 5, 1965, bringing the total to more than \$26 million. It completes the allocation for fiscal year 1966.

Of the total distribution, \$19,236,000 is for wildlife restoration and \$6,810,000 is for sport fishery projects. The money comes from excise taxes collected on sport fishing and hunting equipment.

The Interior Secretary said funds apportioned to the States will be used for fish and wildlife restoration projects involving the purchase of land, improvement of areas of land or water for fish and wildlife, and to conduct research for the restoration and perpetuation of those resources.

Under the Federal Aid program, the States initiate the projects and, if they meet the requirements established by the Department of the Interior, the funds allocated are used to reimburse the States up to 75 percent of the cost of completed projects.

The amount allocated for fiscal year 1966 under the Federal Aid in fish and wildlife restoration programs is \$2,286,000 more than the \$23,760,000 apportioned in fiscal year 1965.

Note: See Commercial Fisheries Review, August 1965 p. 34, March 1965 p. 28.



Fisheries Laboratory

NEW TROPICAL ATLANTIC BIOLOGICAL LABORATORY AT MIAMI:

A new Tropical Atlantic Biological Laboratory at Miami, Fla., operated by the Department of the Interior's Bureau of Commercial Fisheries, was dedicated on November 20, 1965. It is located at Virginia Key and is part of the world's largest tropical ocean science complex. The Virginia Key Campus of the Institute of Marine Science, University of Miami, was also dedicated at the same time. The new Federal Laboratory and the Marine Science Campus are on opposite sides of Rickenbacker Causeway in Biscayne Bay, a short distance from downtown Miami.

The new research installation at Miami is an expansion of the Bureau of Commercial Fisheries Biological Laboratory established in Washington, D. C., in 1958, and transferred to Miami in early 1965. The expanded facilities will enable the Bureau's laboratory personnel to continue investigations of the tropical and equatorial Atlantic. These include surveys on the distribution and abundance of surface schools of tuna and their availability to live-bait and purse-seining methods of fishing. Investigations also will be continued on variations in the physical, chemical, and biological environment that combine to produce concentrations of tuna schools.

The dedication of the Tropical Atlantic Biological Laboratory is the culmination of years of planning by the Bureau of Commercial Fisheries for the establishment of a laboratory devoted to the study of fishery-oceanography in the tropical Atlantic.



Great Lakes

MICHIGAN'S PLANS FOR REBUILDING SPORT AND COMMERCIAL FISHERY:

The Great Lakes have the potential of being the greatest sport and commercial freshwater fish-producing waters in the world, predicts the Fisheries Chief of the State of Michigan Conservation Department. He points out that Michigan, with control of 38,575 square miles of the Great Lakes, must assume a role of leadership in rebuilding the fishery in those waters.

The Michigan fisheries official stresses that "the major responsibility for whatever happens to the Great Lakes fishery must be ours." He said that the long rigorous campaign to control the sea lamprey and reestablish the lake trout in the Great Lakes is now foreseeable but that the alewife poses serious problems. The alewife is so numerous it has now become a threat to the survival of all species spawning within the Great Lakes. It accounts for over 90 percent of the quantity of all fish present in the Great Lakes and its numbers are expected to hold steady somewhere near that high level. Because of this, the Fisheries Chief says the time has come to question present objectives of management programs on the Great Lakes.

As the Fisheries Chief pointed out, this enormous potential of Great Lakes sport fishing is now being vigorously assailed by the alewife, helped by the remnant sea lamprey population, and that these problems should be approached by laying down new policies regarding recreational and commercial fishing. In considering some steps that can be taken, it was noted that the lake trout is well on its way to being re-established in Lake Superior. In Lake Michigan, however, it is doubtful that this species can successfully reproduce itself in face of predicted alewife populations. Recognizing this, and the fact that newly-returned lake trout will not spawn for 6 or 7 years, Michigan State fisheries personnel say restocking of the lakes with hatchery trout must be continued at the most rapid rate possible and that regulations must then be modified.

Another plan for improving Great Lakes sport fishing is to put all possible harvest pressure on the alewife. The best solution seems to promote sport fish that eat alewives. "If we can place a predator on the alewife that will be of interest to sport fishermen, we can promote sport fishing as well as help to solve the alewife question for commercial purposes," said the Fisheries Chief. Basically, this is the thinking in the Michigan Conservation Department's program to attempt establishing new species in the Great Lakes and its selection of the silver or coho salmon.

The Fisheries Chief said, "We have examined all facets relating to this fish, and now believe it an excellent choice for introduction to the Great Lakes. We think chances of success are extremely good. According to the Michigan Conservation Department,

silver salmon is comparatively cheap to raise and can be released in streams tributary to the Great Lakes at the size of 4 or 5 inches. It has a strong homing instinct; gives promise of a high return to good spawning streams where they will be planted. This species, together with others of importance such as the steelhead, brown trout, and brook trout, will be pushed by the State of Michigan toward maximum development in the Great Lakes. (Michigan Department of Conservation, Lansing, December 9, 1965.)

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MICHIGAN RECEIVES SUPPLY OF NORTHWEST SILVER SALMON EGGS FOR PLANTING PROGRAM:

Nearly 2.5 million silver (coho) salmon eggs were delivered the latter part of 1965 to the State of Michigan from the Pacific Northwest for introduction of that species in the Great Lakes during the second phase of the Michigan Conservation Department's three-year planting program. The eggs were provided by the States of Oregon, Washington, and Alaska for the cost of shipping and are being held at the Thompson, Harrietta, and Oden State hatcheries in northern Michigan. They will be hatched and reared at those hatcheries for release in northern Great Lakes tributaries in spring 1967 when they will have matured enough to migrate downstream into the big waters. Based on the success in rearing Michigan's first batch in 1965, Michigan fisheries specialists estimate that about 1.5 million young fish will be produced from the latest supply of eggs. High hopes are held for the fish adapting to Michigan waters.

The 1.2 million eggs from Washington come from a particular strain which has been widely used in the Northwest to establish new runs of silver salmon. Another 1.2 million eggs from Oregon are also expected to take to Michigan waters with a good degree of success. Rounding out Michigan's potential planting stock for 1967 are 50,000 eggs of specially adaptable strains which were delivered from Alaska in early December 1965. By the time young fish from this total supply of eggs are ready for release, Michigan will have launched the first plantings under an all-out three-year effort to establish runs of adult silver salmon in Great Lakes streams.

Initial releases will be made in spring 1966 when 750,000 young silver salmon (5 to 6 inches long) will be put in the Platte River

near Honor in Benzie County, Bear Creek near Bear Lake in Manistee County, and the Big Huron River northeast of L'Anse in Baraga County. Those fish are expected to migrate downstream into Lakes Michigan and Superior, grow to maturity, and then return to spawn in the streams where they are to be planted. Some of the faster-growing planted fish will probably try migrating back to their release sites next fall.

The three northern streams to be stocked this spring will in 1967 receive most, if not all, of the fish to be raised from the 2.5 million eggs now in State hatcheries. Some of the young silver salmon may be planted in additional waters. Part of that decision will depend on how well this spring's planted fish show up in the three original streams during fall 1966. (News Bulletin, Michigan Department of Conservation, Lansing.)

Note: See Commercial Fisheries Review, January 1966 p. 32.



Great Lakes Fisheries Explorations and Gear Development

GEAR RESEARCH FOR GREAT LAKES AND INLAND FISHERIES, NOVEMBER 1965:

Highlights of Great Lakes and inland fisheries gear research and technical assistance by the U. S. Bureau of Commercial Fisheries Exploratory Fishing Base, Ann Arbor, Mich., during November 1965:

Oahe Reservoir Gear Research: The Oahe Reservoir field work for the 1965 season ended about mid-November when the Bureau's reservoir fishery research vessel Hiodon was taken from the water and placed in dry-dock near the Bureau's station. Trawling conducted near Mobridge before the haulout resulted in an average catch rate of 284 pounds per 15-minute drag. Carp accounted for 76 percent of the total November catch; the next principal species was sheepshead which accounted for only 6 percent.

Arkansas Farm-Pond Fish Gear Research: Several development and demonstration trials with the farm pond haul seine were carried out in November. The most noteworthy sets were: (1) in a 50-acre pond at Jonesboro where a 1,900-foot net caught 25,000 pounds of channel catfish (these were penned in a 250-foot by 50-foot enclosure to be removed

as needed); (2) in a 36-acre pond at Dumas where a 1,900-foot net caught 21,000 pounds of an estimated 50,000-75,000 pounds of channel catfish; and (3) in a 25-acre pond at the Bureau's Fish Farming Experimental Station at Stuttgart where a 1,900-foot net caught 2,300 pounds of an estimated 4,000 pounds of various species, including paddlefish weighing over 20 pounds.



Great Lakes Fishery Investigations

BIOLOGICAL RESEARCH AND SEA LAMPREY CONTROL, NOVEMBER 1965:

Some of the highlights of Great Lakes and Oahe Reservoir (South Dakota) biological research by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich., during November 1965:

Lake Superior: Biological research on Lake Superior during November was devoted to the assessment of whitefish on their spawning grounds and the distribution and abundance of young-of-the-year lake trout. Large-mesh gill nets set off the north side of Cat Island yielded 18 spawning whitefish with a single mature female. Trawling for young-of-the-year lake trout was conducted over in-shore spawning grounds, resulting in the capture of four young trout. A total of 80 young-of-the-year trout were taken on all grounds during the 1965 season.

The Bureau's research vessel Siscowet made its last biological research cruise of the 1965 season in Lake Superior during November and was berthed for the winter in Bayfield, Wis.

Sea Lamprey Control and Research: Field operations during November were limited to tagging adult sea lampreys, fishing of fyke nets in index streams, and routine maintenance of the Big Garlic River trapping device.

By the end of the month 1,300 parasitic-phase sea lampreys had been tagged by the U. S. Bureau of Commercial Fisheries and the Fisheries Research Board of Canada. Most of the tagging occurred in the St. Marys River below the ship locks and northern Lake Huron off DeTour and Cedarville. Tags were recovered and reported by commercial fishermen--82 tag recoveries have been reported; 3 from Whitefish Bay, Lake Superior, 3

from northern Lake Michigan, and the remainder from Lake Huron.

Fyke-net fishing in 10 Lake Superior streams was over by the end of the month. A total of 83 recently transformed sea lampreys were taken from 4 of the streams. Sea lampreys were captured in 4 of 5 streams sampled in northern Lake Michigan. Fyke-netting was continued in the Ocqueoc River, Lake Huron. The total take at the end of the month was 4,600 sea lampreys. These were held at the Bureau's Hammond Bay laboratory for marking experiments. As of the end of November 1965, 6 groups of 100 sea lampreys were marked with sulphide dyes, fluorescent dyes, and physical marks.

Note: See Commercial Fisheries Review, January 1966 p. 35.



Gulf Fishery Investigations

SHRIMP DISTRIBUTION STUDIES:

M/V "Gus III" Cruise GUS-35 (November 1-12, 1965): Small white shrimp of about 68 count were evident for the first time in fall 1965 from the up to 10-fathom depth in two statistical areas (area 13 and 14) covered during this cruise. As part of a continuing Gulf of Mexico shrimp distribution study, 8 statistical areas were covered by the research vessel Gus III, chartered by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex. The usual standard 3-hour tows made with a 45-foot flat trawl during the cruise totaled 25; 37 plankton tows, 38 bathythermograph (BT) casts, 147 water (Nansen bottle) casts, and 37 bottom grabs also were made.

Area 16 yielded a fairly good catch of 36 pounds of 21-25 count white shrimp from the up to 10-fathom depth, while areas 17, 18, and 19 yielded smaller quantities of white shrimp, mostly 51-67 count.

Catches of brown shrimp were spotty, with best trawl hauls at stations over 20 fathoms: Area 20 yielded 28 pounds of 26-30 count brown shrimp and area 17 yielded 13 pounds of 15-20 count. The amounts of brown shrimp taken in the different depth ranges of other areas covered were very small.

Notes: (1) Shrimp catches are heads-on weight; shrimp sizes are the number of heads-off shrimp per pound.

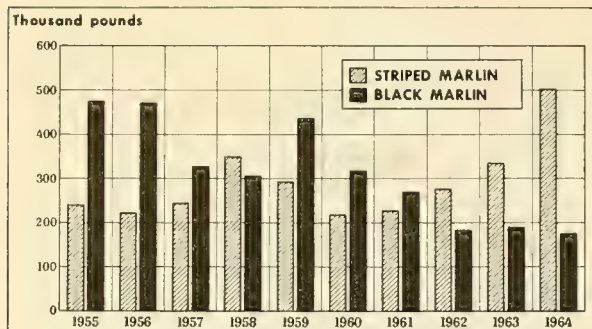
(2) See Commercial Fisheries Review, January 1966 p. 36.



Hawaii

FISHERY LANDINGS, 1964:

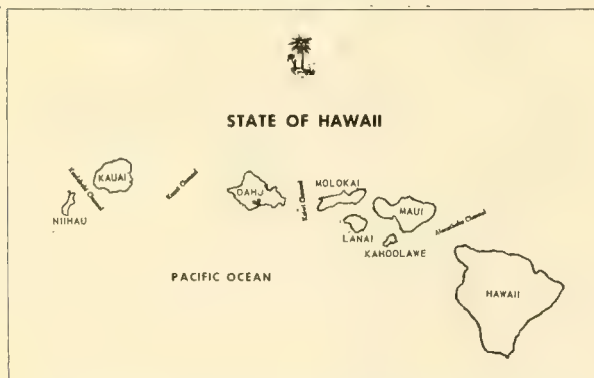
Commercial landings of fish and shellfish in the State of Hawaii in calendar year 1964 totaled 12.7 million pounds with an ex-vessel value of \$2.8 million. Compared with 1963 that was a gain of about 1.0 million pounds (8 percent) and \$168,500 (6 percent). Tuna (albacore, big-eyed, bluefin, little tuna, skipjack, and yellowfin) accounted for 82 percent of the quantity and 67 percent of the value of Hawaiian landings in 1964.



Hawaii catch of black and striped marlin, 1955-64.

Skipjack tuna is the major item in the Hawaiian fishery. The Hawaiian skipjack catch in 1964 totaled 9.0 million pounds valued at \$1.2 million as compared with 8.1 million pounds valued at \$1.1 million in 1963.

The high-priced big-eyed and bluefin tuna landings amounted to 839,485 pounds with an ex-vessel value of \$493,568 in 1964--down somewhat from the 1963 landings of 948,253 pounds valued at \$501,726.



The 1964 Hawaiian landings also included 500,117 pounds of yellowfin tuna, 501,814 pounds of striped marlin, 174,173 pounds of black marlin, 292,262 pounds of jack mackerel, 291,363 pounds of snapper, 160,526

pounds of big-eyed scad, and 107,912 pounds of jack crevalle.

Oahu led the Hawaiian Islands in landings during 1964 with 10.2 million pounds or 80 percent of the total. The Island of Hawaii was next with 1.6 million pounds, followed by Maui with 712,000 pounds. The remainder of the catch was landed at ports in the Islands of Molokai, Kauai, and Lanai.

The 1964 Hawaiian catch was taken by 743 fishermen. Fishing craft operated during the year included 57 vessels (craft of 5 net tons and over), 350 motor boats, and 24 other boats.

Note: See Commercial Fisheries Review, Jan. 1965 p. 33.



Industrial Fishery Products

U.S. FISH MEAL AND SOLUBLES:

Production and Imports, January-October 1965: Based on domestic production and imports, the United States available supply of fish meal for the first 10 months in 1965 amounted to 463,585 short tons--118,776 tons (or 20.4 percent) less than during the same period in 1964. Domestic production was

U. S. Supply of Fish Meal and Solubles, January-October 1965			
Item	Jan.-Oct.		Total 1964
	1965	1964	
	. . . (Short Tons) . . .		
Fish Meal and Scrap:			
Domestic production:			
Menhaden	157,603	148,148	160,349
Tuna and mackerel	22,657	17,213	21,113
Herring	11,801	8,376	8,881
Other	17,527	33,019	44,909
Total production	209,588	206,756	235,252
Imports:			
Canada	36,866	46,784	54,769
Peru	204,841	300,820	348,025
Chile	5,201	11,302	12,942
Norway	49	-	-
So. Africa Rep.	2,900	13,487	18,581
Other countries	4,140	3,212	4,826
Total imports	253,997	375,605	439,143
Available fish meal supply	463,585	582,361	674,395
Fish Solubles:			
Domestic production	86,691	86,791	93,296
Imports:			
Canada	1,293	1,315	1,553
So. Africa Rep.	-	935	987
Other countries	2,536	1,802	1,965
Total imports	3,829	4,052	4,505
Available fish solubles supply . .	90,520	90,843	97,801

2,832 tons (or 1.4 percent) higher, but imports were 121,608 tons (or 32.4 percent) lower than in January-October 1964. Peru continued to lead other countries with shipments of 204,841 tons.

The United States supply of fish solubles during January-October 1965 amounted to 90,520 tons--a decrease of 0.4 percent as compared with the same period in 1964. Domestic production dropped 0.1 percent and imports of fish solubles decreased 5.5 percent.

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U.S. FISH MEAL, OIL, AND SOLUBLES:

Production, October 1965: During October 1965, a total of 12,698 tons of fish meal and about 9.1 million pounds of marine-animal oil was produced in the United States. Compared with October 1964, this was an increase of 4,120 tons of fish meal and about 3.5 million pounds of marine-animal oil. Fish solubles production amounted to 6,609 tons--an increase of 1,473 tons as compared with October 1964.

U.S. Production of Fish Meal, Oil, and Solubles, October 1965 1/ with Comparisons					
Product	Oct.		Jan.-Oct.		Total 1964
	1965	1964	1965	1964	
(Short Tons)					
Fish Meal and Scrap:					
Herring	683	632	11,801	8,376	8,881
Menhaden 2/	6,913	4,693	157,603	148,148	160,349
Tuna and mackerel	2,983	1,720	22,657	17,213	21,113
Unclassified	2,119	1,533	17,527	33,019	34,809
Total	3/12,698	3/8,578	3/209,588	3/206,756	3/225,152
Fish solubles:					
Menhaden	4,152	2,603	68,687	64,673	68,738
Other	2,457	2,533	18,004	22,118	24,558
Total	6,609	5,136	86,691	86,791	93,296
(1,000 Pounds)					
Oil, body:					
Herring	339	360	7,348	9,896	10,354
Menhaden 2/	7,445	4,187	162,997	145,098	157,730
Tuna and mackerel	822	729	4,328	4,151	4,816
Other (inc. whale)	483	331	4,663	7,008	7,298
Total oil	9,089	5,607	179,336	166,153	180,198
1/ Preliminary data.					
2/ Includes a small quantity of thread herring.					
3/ Does not include a small quantity of shellfish and marine-animal meal and scrap because production data are not available monthly.					

1/Preliminary data.

2/Includes a small quantity of thread herring.

3/Does not include a small quantity of shellfish and marine-animal meal and scrap because production data are not available monthly.

* * * * *

Production by Areas, November 1965:
Preliminary data as collected by the U. S. Bureau of Commercial Fisheries:

U.S. Production 1/ of Fish Meal, Oil, and Solubles, November 1965 (Preliminary) with Comparisons			
Area	Meal Short Tons	Oil 1,000 Pounds	Solubles Short Tons
November 1965:			
East & Gulf Coasts,	8,490	7,104	3,627
West Coast 2/	1,839	358	1,262
Total	10,329	7,462	4,889
Jan.-Nov. 1965:			
Total	219,917	186,798	91,580
Jan.-Nov. 1964:			
Total	217,488	174,456	90,557

1/Does not include crab meal, shrimp meal, and liver oils.
2/Includes American Samoa and Puerto Rico.

* * * * *

U. S. MARINE OIL SUPPLY SITUATION AND FOREIGN TRADE, OCTOBER 1964-SEPTEMBER 1965 WITH COMPARISONS:

U. S. stocks of marine oils on September 30, 1965, were reported as 191.9 million pounds, an increase of 30 percent from those on hand a year earlier. During October 1964-September 1965, U. S. production of marine oils was about the same as in the preceding 12 months, but exports were down sharply while imports increased. (Fats and Oils Situation, November 1965, U. S. Department of Agriculture.)

U.S. Marine Oil Production, Imports, Exports, and Stocks, October-September 1963/64 and 1964/65		
	Oct.-Sept. .	
	1964/65	1963/64
	(Million Pounds)	
Production	189.9	192.0
Imports for Consumption:		
Marine-mammal oils	80.5	56.9
Fish-liver oils, medicinal	13.4	15.7
Other fish and fish-liver oils	0.9	4.4
Total	94.8	77.0
Exports: 1/		
Fish oils	116.7	196.4
Marine-mammal oils	0.7	7.3
Total	117.4	203.7
Marine oil stocks: 2/		
Sept. 30, 1965	191.9	-
Aug. 31, 1965	204.4	-
Sept. 30, 1964	147.4	-

1/Includes re-exports.

2/Consists of factory and warehouse stocks including Government stockpile.

Note: Table does not indicate U.S. domestic consumption. For calendar year 1964, U.S. domestic consumption of marine oils was reported as 33.6 million pounds of sperm oil and 47.3 million pounds of fish and marine oils other than sperm oil.

* * * * *

SWINE GROW FASTER WHEN FISH MEAL IS ADDED TO DIET:

Swine-feeding trials to determine the protein supplemental value of fish meal when added to various cereal-vegetable protein mixtures have been conducted by the U. S. Bureau of Commercial Fisheries Technological Laboratory at College Park, Md. Results indicated

that pigs fed on corn-cottonseed meal supplemented with fish meal were marketed 34 days sooner, were 27 pounds heavier, and required less feed for each pound of gain than those animals fed on a corn-cottonseed meal diet alone.



In 92 days after the start of the experiment, pigs fed the corn-cottonseed meal diet containing 6-percent fish meal had reached 200 pounds (the prescribed marketing weight), while those receiving 3-percent fish meal in their diets weighed 184 pounds, and those receiving no fish meal only 173 pounds--a difference of 27 pounds.



Inland Fisheries Explorations and Gear Development

OAHE RESERVOIR TRAWLING STUDIES:

Reservoir Research Vessel "Hiodon"
Cruise 5 (October and November 3-5, 1965): This was another experimental trawling cruise in selected zones of Oahe Reservoir, South Dakota, located on the Upper Missouri River. Trawling operations by the reservoir fishery research vessel Hiodon of the U. S. Bureau of Commercial Fisheries were conducted in Zones 1, 2, 3, 4, and 6 of the reservoir during October 1965. Following the October explorations, the Hiodon concluded its Oahe Reservoir trawling experiments for 1965 with a 3-day survey November 3-5.

FISHING OPERATIONS: A total of 7 drags was made with a 35-foot (headrope) trawl and 52 drags were made with a 52-foot trawl. Mesh size (extended measure) of the cod end of the 35-foot trawl was $\frac{1}{2}$ inch and of the 52-foot trawl, $1\frac{1}{4}$ inches. Drags made over inundated flats totaled 57 and another 2 drags were made in the old river channel. Trawling depths ranged from 8 to 70 feet but most of the drags (46) were made at depths of 10 to 30 feet. Eight of the 52 drags made with the 52-foot trawl were made at night.

Normally, drags lasted 15 minutes each but 2 were 30-minute drags made in Zone 6. The catches of the 30-minute drags were similar in quantity and composition to the 15-minute drags.

Fouling of the gear was not a serious problem during the cruise. One drag was terminated early because of snags, and 2 drags were incomplete because the otter boards dug into the soft bottom. The largest catch per individual drag was made at night in Zone 6 when 1,625 pounds were caught; the smallest catch was in Zone 2 producing only one pound of fish.

FISHING RESULTS: The 59 drags made on the cruise caught a total of 11,365 fish (age group II or older) weighing 12,394 pounds for an average of 193 fish or 210 pounds per drag. Carp (average weight 2.0 pounds) accounted for 38.0 percent of the catch by number and 68.6 percent by weight. Yellow perch accounted for 42.0 percent of the catch by number but only 3.6 percent of the total weight and averaged 0.09 pounds in weight. Bigmouth buffalofish (average weight 2.8 pounds) made up 5.6 percent of the catch by number and 14.6 percent of the total weight.

Seven drags made during the November 3-5 explorations yielded a total of 1,770 fish (age group II or older) weighing 1,985 pounds for an average catch of 253 fish or 284 pounds per drag. The catch was made up (by weight) of 75.8 percent carp, 6.1 percent drum, 5.2 percent bigmouth buffalofish, and 4.3 percent carpsucker. Other species individually accounted for less than 2 percent of the total weight. Carp averaged only 1.5 pounds; bigmouth buffalofish, 2.9 pounds; drum, 0.5 pounds; and carpsucker, 1.5 pounds.

The most productive drag during the early November operations was made with the 35-foot trawl which caught 520 fish weighing 710 pounds (83 percent was carp). The least productive drag was made with the same trawl in the same area--140 fish weighing 50 pounds (27 percent carp and 23 percent yellow perch).

Of 3,900 young-of-the-year fish caught in the 7 drags, 57 percent were black bullheads and 31 percent yellow perch. Other species included black crappie, white bass, goldeye, drum, white crappie, northern pike, sauger, carpsucker, carp, and channel catfish. Of 72 yearling fish taken, 33 percent were goldeye, 24 percent sauger, and 21 percent carpsucker. Other yearling fish caught included black bullhead, yellow pike (walleye), bigmouth buffalofish, and northern pike.

Note: See Commercial Fisheries Review, January 1966 p. 38.



Maine Sardines

CANNED STOCKS, NOVEMBER 1, 1965:

Canners' stocks of Maine sardines on November 1, 1965, were up 60,000 cases from those of the same date in 1964, but down 566,000 cases from stocks on hand November 1, 1963.

The new Maine sardine canning season opened on the traditional date of April 15, 1965, and the pack to November 13, 1965, totaled 1,266,000 standard cases, as compared with the pack of 848,000 cases during the same period of 1964. Bad weather limited herring fishing in late November and herring landings were very light.

ings in 1965 were moderately above a year earlier, but still considerably below the more than 2-billion-pound annual catches of the early 1960's. During the entire 1965 season, landings in only two months equalled the average catch for the 1960-64 period. Atlantic Coast landings were on a par with 1964 while the Gulf of Mexico catch was up more than one-tenth.

The quantity of fish meal available for domestic distribution during 1965 was down substantially due to a decline of more than one-third in United States imports--domestic fish meal production from menhaden and other finfish (excluding meal from shellfish and marine animals) was near that of 1964. Pre-

Canned Maine Sardines--Wholesale Distributors¹ and Canners¹ Stocks, November 1, 1965, with Comparisons^{1/}

Type	Unit	1965/66 Season	1964/65 Season					1963/64 Season				
		11/1/65	7/1/65	6/1/65	4/1/65	1/1/65	11/1/64	7/1/64	6/1/64	4/1/64	1/1/64	
Distributors	1,000 actual cs.	289	194	198	236	238	291	234	254	291	261	
Canners	1,000 std. cs. 2/	689	295	203	314	538	629	514	499	658	1,063	

^{1/}Table shows marketing season from November 1-October 31.

^{2/}100 $3\frac{3}{4}$ -oz. cans equal 1 standard case.

Source: U.S. Bureau of the Census, Canned Food Report, November 1, 1965.

The new law legalizing year-round canning of Maine sardines removed the traditional December 1 closing date for the packing season. The new legislation opened winter canning to all Maine sardine packers and allows winter canning with domestic as well as imported herring. About 10 Maine sardine canneries were still operating in late November 1965.

Final data show the 1964 pack as 865,751 standard cases (100 cans of $3\frac{3}{4}$ -oz.) canned in 23 plants in Maine. That was much less than the 1,619,000 cases packed during 1963, but more than the 754,000 cases packed during the regular season in 1961 when fishing was extremely poor.

The total supply available on November 1, 1965, was 1,518,000 standard cases, 5 percent more than the supply of 1,440,000 cases a year earlier.

Note: See Commercial Fisheries Review, October 1965 p. 36.

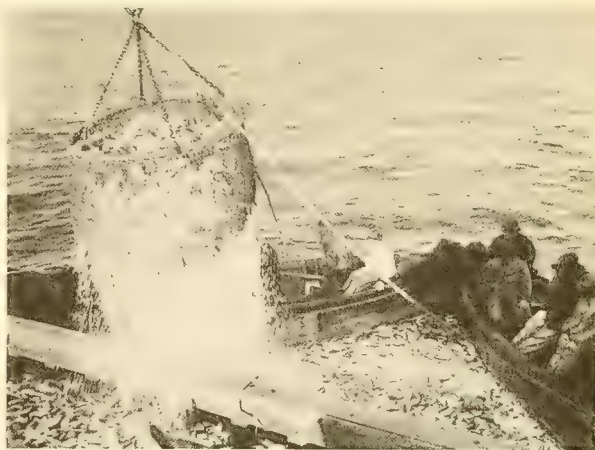


Menhaden

REVIEW OF U. S. MENHADEN INDUSTRY, 1965:

The menhaden fishery, the largest U. S. fishery in terms of landings, has again fallen short of expected production. Menhaden land-

liminary estimates point to production of more menhaden meal in 1965 but less meal from other finfish.



Brailing menhaden from the pocket or bunt of a purse seine. Fish meal, oil, and solubles are produced from menhaden. More modern purse seiners are now equipped with large suction hoses to transfer the fish from the net to the vessel.

World production of fish meal in 1965 probably was somewhat below a year earlier, due largely to the sizable decrease in Peruvian output. Over the past 5-6 years, Peru has become the world's largest producer-export-

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 755

er of fish meal. In 1965, however, the anchoveta resource was not as abundant as in 1964, resulting in a sizable decrease in Peru's anchovy meal production. Therefore, United States fish meal imports from Peru in 1965 were down considerably from the record of 1964.

The price of fish meal in the United States is affected to some extent by the domestic demand for fish meal as a feed ingredient by both the broiler and livestock industries. However, world supply and demand affects the domestic price level to a much larger degree. In 1965, world production of fish meal was down from a year earlier, and demand, both domestic and foreign was strong. Those factors caused U. S. prices of both domestic and foreign meal to advance to a record high of \$186 per ton in November 1965. At this price level, there are indications that the ratio of fish meal to other feed ingredients used in broiler and animal rations may be further reduced.

The U. S. broiler industry is the largest single user of fish meal. Further expansion in the broiler industry is expected because of: (a) an expanding number of people, (b) an increase in per capita disposable income, and (c) broiler meat prices as related to prices of other meat products. As more broilers are produced, the quantity of fish meal consumed will increase when fish meal prices are competitive with other high-protein feed-stuffs. Based on research in least-cost broiler ration formulation and June 1965 wholesale prices of feed ingredients, fish meal prices were competitive when below \$157 per ton. If high fish meal prices continue, the broiler industry may experiment with rations which include other feed ingredients and find that the results are comparable to rations with fish meal included. (Branch of Current Economic Analysis, Division of Economics, U. S. Bureau of Commercial Fisheries.)



Michigan

NEW STATION FOR WARM-WATER FISH RESEARCH PLANNED:

As the first step toward establishing a warm-water fish research station in southeastern Michigan, a privately-owned fish-rearing facility south of Saline, Mich., was

leased late in 1965 by the State of Michigan Conservation Department. The property will be bought outright after July 1, 1966, if the money needed for the purchase is appropriated. The new facility will be used as a unit of the Conservation Department's Institute for Fisheries Research at Ann Arbor, Mich.

First efforts of preparing the leased property for fisheries studies will be aimed largely at making improvements on 17 fish-rearing ponds. Some attention will also be given to several buildings covered by the lease. Longer-range plans call for developing about 14 additional ponds, and building an experimental aquarium or "wet" laboratory.

After the site is readied for operation as a full-fledged research station, it is hoped to carry out three major fish studies in the ponds. One of the studies will be on the production of fish-food organisms. Basically, that research will be to try to determine which types of organisms can best be increased to provide better food supplies for fish. Under a second branch of investigations, some of the station's ponds will be used to study bluegills which will have been subjected to radiation. The main thing it is hoped to find out is whether radiation can be used effectively to sterilize bluegills. The emphasis on that research will be efforts to come up with a technique which will control overpopulations of stunted bluegills.

The third main research project scheduled for the new station will involve studies on the natural reproduction of bass and the survival of bass eggs and fingerlings. Factors such as water temperatures, food supplies, water chemistry, and predation will be weighed in an effort to learn their effects on that species.

Several other research projects are being planned for the scheduled experimental aquarium. Among them will be a study measuring pituitary extract in the blood systems of bluegills to see if fish growth can be speeded up. Tests will also be conducted in the aquarium in an attempt to find a suitable chemical dye which can be used for the large-scale marking of fish to assist fact-finding and management work. (News Bulletin, Michigan Department of Conservation, Lansing, November 18, 1965.)



Nautical Charts

LISTS FOR ATLANTIC AND GULF COASTAL WATERS:

The free distribution to mariners of catalogs listing all available nautical charts for use in navigating U. S. Atlantic and Gulf coastal waters was scheduled to begin January 2, 1966, by the Coast and Geodetic Survey, U. S. Department of Commerce. Similar catalogs will be issued in mid-summer for the Pacific and Alaskan coasts. The catalogs will be accordion-folded, similar in format to road maps.

The catalog for the Atlantic and Gulf coasts also includes Puerto Rico and the Virgin Islands; for the Pacific coast it includes Hawaii, Guam, and the Samoan Islands; and for the Alaskan coast it includes the Aleutian Islands.

The catalogs list the numbers of all charts, the areas they cover, chart prices, and the scale of each chart. Both small craft and conventional charts are listed. Small-craft chart numbers and the outline of the area covered are shown in green and the conventional nautical charts in magenta and blue. The catalogs also include a list of tide tables, coast pilots (sailing direction), current tables, and tidal current charts.

Nautical chart diagrams have been available before, but on a much more limited scale. Information up to now has generally been furnished only for specific areas rather than for entire coasts.

An initial printing of 60,000 to 70,000 copies has been run off for distribution at exhibits of Commerce's Environmental Science Services Administration at boat shows along the Atlantic and Gulf coasts. The catalogs are also available, in person or by mail, from chart distribution centers at Coast and Geodetic Survey offices in San Francisco and New York and at the Survey's sales office, 1125 Commerce Building, Washington, D. C. 20230. A list of the 600 agents who sell nautical charts is also available in a similar format.



New York

NEW SITE TO BE ACQUIRED FOR NEW YORK CITY WHOLESALE FISH MARKET:

New York City plans to acquire a 100-acre site in the Hunts Point section of the Bronx

for the establishment of a wholesale fish and meat market. The Mayor of New York has certified \$2.3 million in additional funds for the purchase and directed the various City agencies to proceed with the acquisition. It was hoped that the sale could be consummated early in 1966.

The new fish and meat markets will house the fish dealers located in the existing Fulton Fish Market and the wholesale butchers in the present 14th Street, Brook Avenue, and Harlem Meat Markets. The Hunts Point site will offer modern quarters with truck-loading platforms and direct rail connections. The Hunts Point site is contiguous to the 126-acre New York City Product Terminal. When completed, the new meat and fish market together with the produce terminal will form the largest perishable food distribution center in the world. (New York City Wholesale Markets Progress Report, November 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 30.



North Atlantic

SOVIET FISHING ACTIVITY OFF COAST, DECEMBER 1965:

Soviet vessel fishing activity in December 1965 increased slightly over the previous month and was about normal for that time of year. A total of 35 Soviet vessels was sighted during the month. They were identified as 28 fish-factory stern trawlers, 2 "Skyplev Class" processing and refrigerated stern trawlers, 4 refrigerated fish transports, and 1 medium class side trawler. This compared with an estimated 25 vessels in November 1965 and 20 vessels in December 1964.



Fig. 1 - Soviet stern trawler-factoryship of Pushkin class fishing in North Atlantic.

The Soviet vessel observations were made by the staff of the Fisheries Resource Man-

agement Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., which conducts weekly reconnaissance flights cooperatively with the U. S. Coast Guard.



Fig. 2 - Another Soviet factory-type stern trawler in North Atlantic.

Except for a short period late in the month, Soviet fishing operations were generally confined to the "southeast part" of Georges Bank, 120 to 130 miles southeast of Cape Cod, fishing at depths of 30 to 50 fathoms. The majority of vessels were actively fishing. Heavy to moderate catches of fish on deck and in their trawls appeared to be primarily whiting, scrod haddock and related mixed groundfish. U. S. fishing vessels reported excellent catches of scrod haddock throughout the month, while fishing in the immediate vicinity of the Soviet fleet.



Fig. 3 - Soviet refrigerated fish transport operating in the North Atlantic.

Late in December the Soviets abruptly shifted their fishing operations southward along the 100-fathom curve from Block Canyon (60 miles south of Block Island, R.I.) to Veatch Canyon (30 miles south of Nantucket lightship). Apparently due to insufficient quantities of fish in those areas, the Soviets resumed their operations on Georges Bank. It was expected, however, that they would return to fish for red hake as they did so successfully from January through March 1965.

The British factory stern trawler Fairtry I was seen on Georges Bank during the month.

The sisterships Fairtry II and Fairtry III were sighted on the "northeast peak" of Georges Bank in February 1964.

A very limited number of Soviet fishing vessels have been operating off the Eastern Nova Scotia areas.

Note: See Commercial Fisheries Review, January 1966 p. 40.



North Pacific Fisheries Explorations and Gear Development

HAKE AND ANCHOVY POPULATION SURVEY:

M/V "John N. Cobb" Cruise 74 (October 11-November 18, 1965): To determine the geographic and bathymetric distribution of schools of Pacific hake (Merluccius productus) and anchovy (Engraulis mordax) along the coasts of Vancouver Island, British Columbia, Washington, and Oregon as far as Coos Bay during October and November was the primary objective of this cruise. Secondary objectives by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John N. Cobb were to: (1) obtain biological data on those species, (2) obtain additional data relative to the catching efficiency of the Mark II "Cobb" pelagic trawl, and (3) obtain bathythermograph (BT) data.

The gear used was the same as for previous hake explorations in that the echosounder was used to locate the fish schools and the "Cobb" pelagic trawl was used to fish favorable looking echograms.

Onshore-offshore echo-sounding transects were made at oblique angles to the coasts between the 20- and 200-fathom contours; between Willapa Bay and Destruction Island, parallel transects were run from the 20- to 60-fathom contour.

During the first three weeks of the cruise the area from Cape Flattery, Wash., to Cape Cook on the west coast of Vancouver Island was surveyed. Echo-sounding indicated hake at a depth of 65 fathoms over a bottom depth of 80 fathoms of water off Barkley Sound, Vancouver Island. A one-half-hour tow (lat. 48° 41' N., long. 125° 44' W.) yielded a catch of 18,000 pounds of hake. The fish ranged from 51 to 68 centimeters (20.1 to 26.8 inches) and averaged 57 centimeters (22.4 inches)

long. Sounding transects showed the school to be about 4 miles wide and 6 miles long, and that it was confined to a small area of Barkley Sound (80-fathom depth) which extended into La Perouse Bank. The surrounding area of 50-fathom depths or less showed no signs of hake. A 1-hour tow was made on light echo-tracings at lat. $48^{\circ}45'$ N., long. $126^{\circ}12'$ W. which yielded 200 pounds of hake. They also averaged 22.4 inches with a range of 19.6 to 27.2 inches. That area was about 20 miles west of the Barkley Sound school of hake over a bottom depth of about 80 fathoms. The fish were about 65 fathoms from the surface. No hake were located from that point to Cape Cook.

During the last 3 weeks of the cruise, sounding transects were made from Cape Flattery, Wash., to Coos Bay, Oreg. No appreciable signs (echo-tracings) of either hake or anchovies were found during that period. A 30-minute tow on a light echo-trace at lat. $47^{\circ}35'$ N., long. $124^{\circ}50'$ W. yielded 90 pounds of dogfish (*Squalus acanthias*), 80 pounds of rockfish (*Sebastes* sp.), and 3 female hake in a near-ripe stage.

Related activities of the cruise included: (1) the collection of biological data by personnel of the Bureau's Seattle Biological Laboratory, (2) the delivery of hake samples to the Seattle Technological Laboratory for meat analysis, and (3) making the usual bathythermograph (BT) observations.

Note: See *Commercial Fisheries Review*, December 1965 p. 41.

* * * * *

PELAGIC FISHING GEAR RESEARCH:

M/V "St. Michael" Cruise 7 (August-November 1965): A 100-day gear research cruise for fishing hake and herring was completed November 16, 1965, by the exploratory fishing vessel St. Michael, chartered by the U. S. Bureau of Commercial Fisheries. Fishing for hake was conducted along the coast of Washington from Cape Flattery to the Columbia River. Other cruise activities included diving operations in Puget Sound near Seattle, and herring fishing in inside waters of Beltingham Bay and in the Strait of Georgia.

Scheduled objectives of the cruise were:

1. Test the effectiveness of a $\frac{2}{3}$ -scale pelagic trawl, a 440-mesh "Cobb" pelagic trawl, a 640-MONO-pelagic trawl, and a lampara trawl No. 2 on Pacific hake (*Merluccius productus*).
2. Using the above nets from the vessel St. Michael, conduct parallel comparative tows with another Bureau chartered vessel, the Western Flyer, using a standard 18 "Cobb" pelagic trawl.

3. Evaluate various electronic telemetry devices, including a variable resistor catch-load indicator, wing-tip depth sensing units, headrope transducer, simplified bottom contact indicator, Furuno Net Sonde, and Standard Control, Inc.'s Depth Telemetry System.

4. Assist the Western Flyer to locate hake schools off the coasts of Washington and Oregon.

5. With the aid of SCUBA-equipped scientists, visually evaluate the physical characteristics of various pelagic trawls in operation. Determine effect of non-symmetrical bridles on net opening.

6. Make underwater observations of fish within the influence of a trawl and photograph their reactions.

7. Conduct fishing trials for herring (*Clupea harengus pallasii*) using a Canadian-type small-mesh midwater trawl.

EQUIPMENT: The St. Michael is a 72-foot seine-type vessel powered by a 380-hp. engine and was operated by a four-man crew. Hydrofoil otterboards and electrical towing cable were used on all drags.

Tests were conducted using the following nets which were constructed of multifilament web except the 640-MONO-pelagic trawl:

1. 640-MONO-pelagic trawl (similar to a standard "Cobb" trawl except that it has 640 meshes across the mouth instead of 600 meshes, the anterior 400 meshes of the body are made of ribbon type monofilament web, and the posterior 200 body meshes and wings are of multifilament web).
2. A $\frac{2}{3}$ -scale pelagic trawl (same proportions as a standard "Cobb" pelagic trawl except using 2" instead of 3" web).
3. A 440 pelagic trawl (a shortened version of the standard, having 440 meshes across the mouth instead of 600 meshes).
4. Lampara trawl No. 2 (a trawl with very long wings similar to a lampara seine). It differs from the original net in that the rope and chain headrope and footrope are replaced by wire rope and the percentage web hang-in is less.
5. Canadian-type herring trawl (a small pelagic trawl having a 73-foot headrope and variable mesh size from 5" at headrope to $1\frac{1}{4}$ " mesh at cod end).

RESULTS: Comparative drags: A limited number of parallel drags was made by the St. Michael near the Western Flyer which towed a standard 18 pelagic trawl. Both the $\frac{2}{3}$ -scale and 440-trawls caught hake at about the same rate as the standard size net. Maximum catch for the $\frac{2}{3}$ -scale trawl was 18,000 pounds in 60 minutes and 45,000 pounds in 90 minutes for the 440 trawl.

The 440 trawl moved through the water about 15 percent faster than the standard net, using the same vessel horsepower, thus making it easier to control in strong cross tides. No similar data is available for the $\frac{2}{3}$ -scale trawl.

No comparative tows were made using the lampara trawl No. 2. Four independent tows

on good echo-sounding traces yielded an average of 7,200 pounds of hake per tow, considerably less than expected. The largest single tow was 12,000 pounds.

ELECTRONIC DEVICES: A quick disconnect electrical jumper system was successfully tested. It was used to by-pass the otterboards so energy could be transmitted from the vessel to various telemetry devices located on the trawl. Conventional $\frac{1}{2}$ " cable bridles were replaced with electrical conductor cable.

Prior to the development of the jumper system, depth-sensing units were terminated at the otterboards. The depth of the otterboards in relation to the trawl was not exactly known. During the diving operation, the divers found that the otter boards were only 5 to 10 feet deeper than the top wing tips. Using the jumper system allowed the sensing units to be placed at each upper wing tip, each lower wing tip, or at one upper and lower wing tip. In this way, the exact depth of the headrope and footrope was known and centered in the greatest fish concentration.

Some success was achieved in using a headrope transducer connected to the wing tip bridle termination which read out on the pilothouse depth-sounder. When functioning properly, fish passing into the net, depth of the footrope, and depth from footrope to the ocean floor was shown on a chart. Additional testing of this device is necessary.

A catch-load indicator composed of a variable resistor attached to the cod end was tested. The signal was transmitted through a wire threaded along a corner ribline to the bridle and towing cable and up to the pilothouse where it read out on a calibrated ammeter. Only limited success was achieved with this instrument due to water leakage in the electrical components. When perfected, this device will be of major value in the trawl fishery.

The bottom contact indicator, composed of a mercury switch attached to a heavy weight, also utilized the electrical towing cable to transmit an electrical signal from the switch to a light in the pilothouse. The object was to suspend the weight a predetermined distance below the otter board on an electrical cable. When the weight struck bottom, the new angular position would cause the switch to actuate. The pilothouse light then came on,

indicating that the otter board was a distance above bottom equal to the cable length. In practice, the weight necessary to hold the switch nearly vertical while under tow was too great to be conveniently handled.

A Furuno "net sonde" was tested as a net depth indicator; it worked well for three tows before it malfunctioned.

The Standard Control, Inc.'s Depth Telemetry System was equipped with an inadequate meter readout. A new meter was obtained but was not tested.

UNDERWATER OBSERVATIONS: Net Configuration: All variations of the "Cobb" pelagic trawl had effective configurations. Diver observations were made in less than 120 feet, using 40 fathoms towing cable. Not enough towing cable can be put out to permit full net expansion during diver observations. The $\frac{2}{3}$ -scale pelagic trawl opens to about 40 by 23 feet across the mouth. The 440-pelagic trawl opens to about 70 by 30 feet, and the 640-pelagic trawl opens to about 75 by 34 feet. The lampara trawl No. 2 had an improved configuration over the original design tested in 1964. Wings and mouth opened to a maximum of 20 feet vertically. A Canadian-type midwater herring trawl constructed of variable mesh web was evaluated by divers. This net has an excellent configuration in the water. Because of its smaller size, it can be towed much faster for a given power than any of the pelagic trawls. A large amount of water is strained, indicated by the fact that the divers took a current reading of 2.8 knots within the trawl.

Net Bridles: Instead of the usual 60-fathom bridles, 40-fathom bridles from the otterboard to the trawl wing tips were used. Underwater measurement showed there was no loss in net opening. Both 60-fathom and 40-fathom bridle sets were tested using electrical conductor cable. There was no measurable effect on the trawls when one electrical bridle was paired with a $\frac{1}{2}$ " conventional cable.

Fish Behavior: Divers observed bottomfish, herring, smelt, and squid within the influence of the trawls. Fish could easily swim along within the "Cobb" pelagic trawls. However, herring (5 to 7 inches long) had difficulty maintaining their position within the Canadian-type trawl when water flow was over 2.5 knots. The divers observed squid (10 to 12 inches long) which swam with her-

ring against a 2-knot water current in the trawl for several minutes. The large-mesh web permitted them to escape when they became tired and drifted into it.

Hake, which had been caught during a 30-minute tow in 25 fathoms of water, were hauled in to a 10-fathom depth and then the tow was resumed for another 90 minutes. Divers descended to observe the effect of a 15,000-pound catch on the configuration of the trawl. No hake were found swimming in the trawl body. Few fish were in the anterior portion of the cod end. A large bag of fish (about 10 feet in diameter) formed at the bitter end of the cod end. This caused the forward part of the cod end to be stretched nearly closed and possibly the trawl mouth area to be reduced, suggesting that the net catch rate probably goes down as the catch increases. Most hake were able to swim away when the cod end was opened at 10 fathoms by the divers.

Midwater herring trawling experiments: The variable web Canadian-type midwater trawl was fished in northern Puget Sound. Echo traces indicated large schools of herring and smelt were present and some catches were made by local purse-seine vessels. Seven drags were made on excellent traces. The largest single catch was about 800 pounds of mixed herring and smelt.

GENERAL OBSERVATIONS: Although fish signs observed on the echo-sounder were good, and the underwater configuration of the lampara trawl and Canadian-type midwater trawl was excellent, fish catches by both nets were less than expected. Herring, smelt, and squid appear to swim out of a net; conversely, hake have little swimming endurance and are readily carried back to the cod end.

Note: See Commercial Fisheries Review, October 1965 p. 44.



Oceanography

MARINE ENGINEERING EXPERIMENT STATION PROPOSED BY SOUTHERN NEW ENGLAND GROUP:

A 6 member committee was formed in late 1965 by the Southern New England Marine Sciences Association (SNEMSA) to study the possibilities of establishing a marine engineering experiment station.

"As now envisioned, the experiment station would be a nonprofit research organization which would seek to bridge the gap between university scientists and industry with the ultimate objective of reaping greater benefits from our ocean resources," said the dean of the University of Rhode Island Graduate School of Oceanography, who is also Chairman of SNEMSA.

The Southern New England Marine Sciences Association was formed in the spring of 1965 by the University of Rhode Island and marine-oriented businesses and industries to promote the Southern New England region as a national center for study and development of ocean sciences. The 71 members of the Association are concentrated in the 75-mile strip of land from New London, Conn., to Woods Hole, Mass. (University of Rhode Island, December 7, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 38.

* * * * *

NEW INSTITUTE FOR OCEANOGRAPHY SET UP WITHIN U. S. DEPARTMENT OF COMMERCE:

The formation of an Institute for Oceanography was announced December 26, 1965, by the Environmental Science Services Administration (ESSA) of the U. S. Department of Commerce.

ESSA was established in July 1965 within the Department of Commerce to serve as a focus for national efforts to describe, understand, and predict man's natural environment. It includes the Weather Bureau, the Coast and Geodetic Survey, and the former Central Radio Propagation Laboratory of the National Bureau of Standards.

The Institute for Oceanography, one of ESSA's four Institutes for Environmental Research, will conduct a comprehensive research program designed to gain new knowledge of the ocean and its boundaries with the atmosphere, the shore, and the sea floor. Its wide range of marine research activities includes marine geology and geophysics, physical oceanography, and the interactions between the ocean, the earth, and the atmosphere.

"Greater understanding of the ocean is needed to improve and expand the services ESSA provides," the administrator of the agency said in announcing the creation of the new Institute. "Lack of knowledge about the

interactions between the atmosphere and the ocean is a major obstacle to long-range weather forecasting and to improving predictions of ocean waves, water temperatures, coastal currents, and surf and other ocean conditions."

"Safe and economical use of the ocean," he states, "requires that we know much about the whole complex and fascinating marine environment. By expanding man's knowledge in the fields of physical oceanography and marine geology, the Institute for Oceanography will assist those groups interested in exploiting ocean resources."

The new Institute for Oceanography has headquarters in Washington, D. C., and field installations at Norfolk, Va., Seattle, Wash., and Honolulu, Hawaii. In addition to those oceanographic research projects conducted wholly within the Institute, it will encourage and support cooperative research programs carried out jointly with universities and private institutions.

Working with the Coast and Geodetic Survey, the Institute for Oceanography will continue the scientific exploration and mapping program (SEAMAP) which is part of the Interagency Committee on Oceanography's U. S. National Plan for Ocean Surveys. Those systematic oceanographic surveys will be conducted aboard vessels operated by the ESSA Coast and Geodetic Survey. In the past, the SEAMAP program has been limited to the area between the Aleutian and Hawaiian Islands. It will be expanded in 1966 when two new oceanographic vessels are commissioned by ESSA. Those two ships--the Oceanographer and the Discoverer--will be the largest, most modern oceanographic research vessels built in the United States. Each vessel will have more than 4,100 square feet of laboratory area.

Data gathered aboard vessels of the Coast and Geodetic Survey are used by the Institute's scientists in studies of marine geology and geophysics. The marine geologists investigate the topography of our Continental Shelves to learn how they were formed and how they have changed with time. Characteristics and distribution of bottom sediments and the environmental processes that caused them also are studied by the marine geologists. The Institute's geophysical research includes marine gravity and magnetic studies at sea and investigations of seabed structures below the sea floor.

In the field of physical oceanography, Institute scientists investigate ocean circulation, tides, and waves, as well as the physical and chemical properties of sea water. An important task facing the Institute is the development of new methods of predicting the height of tsunamis or seismic sea waves, in order to improve the accuracy of forecasts issued by the Coast and Geodetic Survey's Seismic Sea Wave Warning System.

The Institute's physical oceanographers also conduct basic oceanographic research leading to increased understanding of the dynamic processes at work in the oceans. Such knowledge is essential for developing techniques of predicting changes in those ocean characteristics--such as waves, currents, temperature, and the overall marine environment--which are important to the activities of man.

In the Institute for Oceanography, meteorologists and oceanographers will work together to achieve new understanding of the intricate relationships between the ocean and the atmosphere. The atmosphere affects the ocean as much as the ocean affects the atmosphere.

Studies leading toward the understanding and prediction of the effects of waves, tides, and currents on the Continental Shelf and along the coasts also are being undertaken by the Institute.

An oceanographic laboratory, co-located with the Coast and Geodetic Survey Marine Center at Seattle, Wash., is a field facility of the Institute. That laboratory carries out programs in physical and geological oceanography and marine geophysics in cooperation with the Institute's other laboratories and with the Coast and Geodetic Survey.

In addition, the Institute for Oceanography includes two small specialized research groups--one located at the University of Hawaii, and the other at the University of Washington--which have been established so that Institute and university scientists can work closely on problems of mutual interest.

Through the activities of the new Institute, the Coast and Geodetic Survey and its other scientific groups, ESSA expects to learn more about the ocean so that it can provide improved oceanographic services as required by the nation to support its marine operations.

(U. S. Department of Commerce, December 26, 1965.)

* * * * *

"SEA SPIDER" SET IN ATLANTIC TO SERVE AS STABLE OCEANOGRAPHIC BUOY:

In September 1965, the first stable oceanographic buoy, nicknamed Sea Spider, was installed in half-mile deep water off the coast of South Carolina.

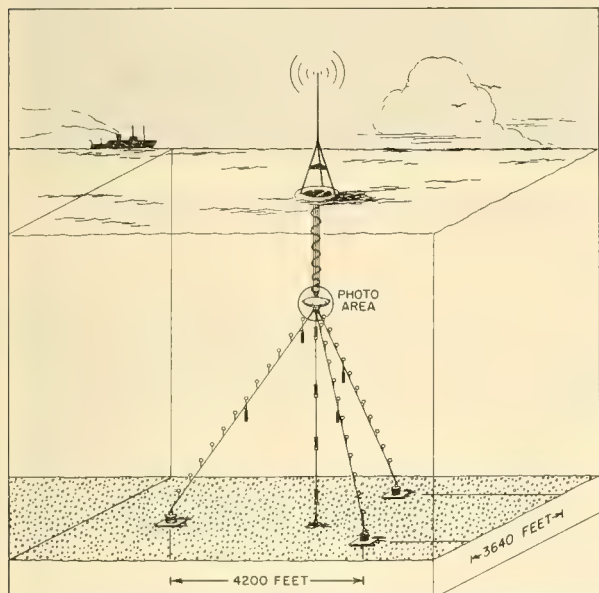


Fig. 1 - Artist's diagram of Sea Spider showing anchoring system.

Sea Spider, designed and installed by scientists of the Woods Hole Oceanographic Institution, Woods Hole, Mass., is a saucer-shaped aluminum float securely held to the ocean bottom by four long steel cables. Various instruments and buoyant hollow glass spheres are attached along the spider-leg cables and the saucer, which is placed 110 feet below the ocean surface to avoid buffeting by wind or waves.

A telemetering buoy at the sea surface transmits data collected from those instruments by radio to a nearby oceanographic vessel.

The structure will give oceanographers their first virtually motionless reference point and instrument support in the deep ocean. It is far more stable and reliable than other sea-measuring instruments, which are usually suspended or towed from surface ves-



Fig. 2 - Shows aluminum sphere of Sea Spider anchored 110 feet below the surface.

sels or are attached to buoys anchored by a single cable.



Fig. 3 - Closer view of top of Sea Spider.

These traditional instrument bases are not very steady since they sometimes swing around with a radius almost as great as the depth of water. During a period of 21 hours, oceanographers found that the Sea Spider buoy moved less than 10 feet in any direction.

The instruments on Sea Spider, placed on Blake Plateau which is part of the U. S. continental shelf in the Atlantic Ocean, will record such measurements as ocean currents, temperature variations, and underwater sounds.

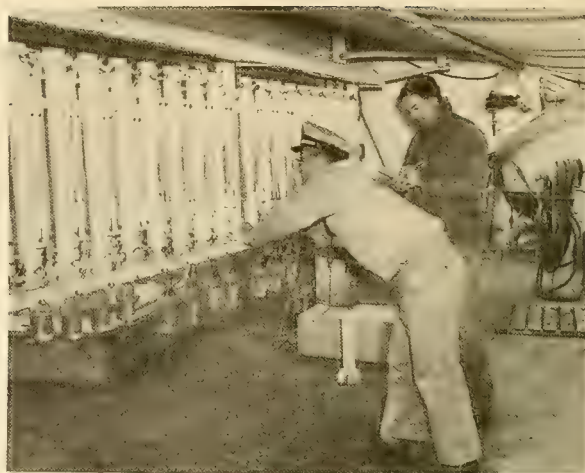
As divers were installing and checking the equipment, they noticed large schools of fish attracted to the spherical buoy throughout the 3-week test. Scientists believe the sphere might be modified for biological studies of the ecology and habits of fish in the deep ocean. (Science News Letter, October 16, 1965, and Woods Hole Oceanographic Institution, September 24, 1965.)

* * * * *

BOUNDARY BETWEEN ARCTIC AND NORTH ATLANTIC OCEANS SURVEYED BY U.S. COAST GUARD CUTTER "EVERGREEN":

The U. S. Coast Guard Cutter Evergreen was scheduled to conduct an oceanographic survey along the boundary between the North Atlantic and Arctic Oceans from Greenland to Iceland to Scotland in October and November 1965. The July 1965 transects in that area by the U. S. Coast Guard Cutter Northwind were to be repeated by the Evergreen. Thus information obtained from the Evergreen cruise will supplement the Northwind's efforts. The itinerary called for 1 occupation of the section between Greenland and Iceland and 4 occupations of the Iceland-Scotland section.

The main objective of the cruise is to study the interchange between the waters of the North Atlantic Ocean and adjacent seas. A field party from the Coast Guard Oceanographic Unit will supervise observations. Particular attention will be given to the study of the variation of northeast-flowing Atlantic water and southwest-flowing Norwegian Sea water between Iceland and Scotland. The accumulation of information in that area is necessary for the study of heat and water exchange and to contribute to a greater understanding of cyclic phenomena in the North Atlantic.



Temperatures of water samples collected in Nansen bottles are recorded aboard the U.S. Coast Guard oceanography cutter Evergreen.

The results of the Evergreen cruise together with the July 1965 Northwind survey will be reported in the Coast Guard Oceanographic Report series. (U. S. Coast Guard Oceanographic Unit, September 9, 1965.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 42, Sept. 1965 p. 40.

Oregon

CHANGES IN FISHERY REGULATIONS ADOPTED BY FISH COMMISSION:

In an effort to streamline and modernize Oregon's commercial fisheries code, the Oregon Fish Commission, at its regular monthly meeting held November 8, 1965, adopted a number of regulation changes, reworded several of its directives, and spelled out definitions of various terms used in regulatory matters.

Among the regulation matters treated by the Oregon Fish Commission were the following:

It was made mandatory for the skipper of each licensed trawl vessel to maintain a log showing details on the landings of fish. The log is to be made available upon request to an authorized representative of the Commission for examination and transcription of information. All data received by the Commission are treated as confidential. The Commission considers that this information is

vital to the proper management of the highly important trawl fishery.

Shad and striped bass regulations on the coastal rivers were defined, with minor changes including elimination of weekend closures in the fishery.

It was made unlawful for commercial fishermen to have in their possession any salmon taken as an incidental catch when fishing under provisions of regulations covering the commercial fishery for shad and striped bass. It was stipulated that any salmon caught in such nets must be returned to the water immediately and with the least possible injury to the fish.

Clarification of a matter that has been of concern to both commercial and sports fishermen as well as enforcement officers was made with approval of a section of the resolution stating that it is illegal to have on board any commercial fishing vessel while fishing for or landing food fish for commercial purposes, any fishing gear not authorized by statute or regulation or which does not conform to the specifications established for such gear. This makes it unlawful to have sport fishing gear aboard a fishing vessel that is fishing for or landing food fish under commercial regulations.

It was also provided that it is unlawful to take or land for commercial purposes any sturgeon over 6 feet in length in the round, or to remove the head or tail of a sturgeon prior to its being initially received at the licensed premises of a wholesale fish dealer or canner.

A variety of other matters were treated under the Resolution adopted by the Commission. Copies of the detailed order, Administrative Order FC 136, are available on request from the Oregon Fish Commission, Portland, Oreg.

In other action, the recommendation that the lower Columbia River seal program be continued at its present level was approved. The \$25 bounty on harbor seals taken in the lower Columbia will be continued and the Commission directed negotiations to continue the contract on seal hunting activities in the lower river at the same level as in recent seasons. (Oregon Fish Commission, Portland, December 9, 1965.)

* * * * *

NEW SALMON FISHWAY COMPLETED FOR COLUMBIA RIVER SYSTEM:

The completion in late 1965 of Sheep Ridge Dam fishway on the Lostine River in Wallowa County, Oreg., has given the fish-producing potential of that important Columbia River system tributary a substantial boost, according to the Oregon Fish Commission.

The Sheep Ridge facility consists of three reinforced concrete retaining walls or sills placed across the full width of the stream creating a stairstep arrangement or pools leading to the impounded water above the dam. This arrangement makes it a simple matter for salmon and steelhead to pass over the irrigation diversion structure even at low-water stages. In addition to installation of the sills, the project also involved the placing of rock riprap at the ends of the sills to prevent erosion and undermining of the concrete work. The project was planned and supervised by the Oregon Fish Commission under terms of a contract with the U. S. Bureau of Commercial Fisheries.

The new fishway, coupled with a similar structure at the City of Lostine's domestic water diversion dam located a mile downstream from the Sheep Ridge site, assures anadromous fish access to at least 15 miles of upriver spawning area during all water stages. The Lostine Dam fishway was completed in March 1963 by an engineering firm under contract with the Oregon Fish Commission. The cost of this project was also provided by the U. S. Bureau of Commercial Fisheries under terms of the Columbia River fisheries development program.

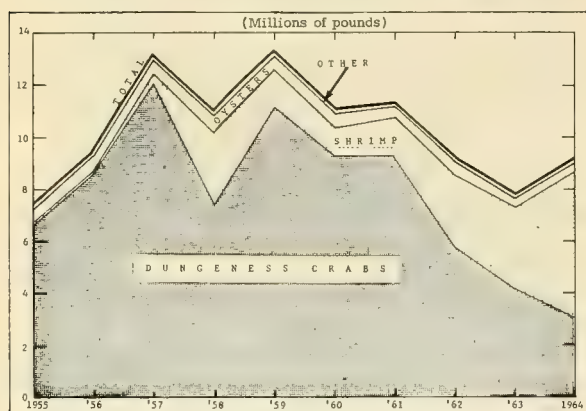
Although runs of spring chinook and steelhead salmon have been maintained in the Lostine over the years, passage of fish has been difficult or impossible during periods of low water. The Fish Commission's Columbia River fisheries management project leader said it is difficult to make any precise prediction as to the effects of the two fishways on the Lostine runs. Improved passage conditions should reduce loss of adult fish by preventing concentration of fish below the dams during low-flow periods when they are more vulnerable to predation and poaching. There has been a small run of silver (coho) salmon in the lower part of the river and it seems likely that ready access will encourage that species to utilize more extensively some of the upstream spawning areas, said the Columbia River fisheries

management. (Oregon Fish Commission, December 13, 1965.)

* * * * *

LANDINGS OF FISH AND SHELLFISH, 1963-1964:

Commercial landings of fish and shellfish in Oregon during 1964 totaled 57.2 million pounds with an ex-vessel value of \$7.0 million--a drop of 7 percent in quantity and 9 percent in value from 1963. The decline was due mainly to a drop in tuna landings. Seven species--flounder, salmon, ocean perch, shrimp, rockfish, tuna, and Dungeness crab--made up almost 93 percent of the 1964 landings.



Oregon shellfish catch, 1955-64.

Salmon: The 1964 salmon landings totaled 9.9 million pounds with an ex-vessel value of \$2.7 million as compared with 1963 landings of 8.3 million pounds valued at \$2.6 million. Silver salmon landings increased in 1964 while king salmon landings declined.

Bottomfish: The 1964 bottomfish landings consisted mainly of 15.4 million pounds of flounder (down 6 percent from 1963), 9.7 million pounds of ocean perch (up 21 percent), and 5.2 million pounds of rockfish (same as in 1963).

Tuna: The Oregon tuna landings were only 4.4 million pounds in 1964 as compared with 11.4 million pounds in 1963.

Shellfish: Shrimp, Dungeness crab, and oysters accounted for about 99 percent of the Oregon shellfish catch. Shrimp landings in 1964 were 5.3 million pounds valued at \$720,000 as compared with 1963 landings of 3.0 million pounds valued at \$263,000. Dungeness crab landings in 1964 amounted to 3.4

million pounds with an ex-vessel value of \$839,000 compared to 4.2 million pounds valued at \$870,000 in 1963. The Pacific oyster harvest in 1964 yielded 334,000 pounds of oyster meats valued at \$106,000, a slight decline from 1963.



Oysters

SUPPLEMENTAL FEEDING OF OYSTERS TESTED:

Ways of feeding oysters commercially, or of supplementing the food of oysters held in ponds, were being tested in 1965 by scientists in marine stations at the Virginia Institute of Marine Science, Gloucester Point, Va., the Bears Bluff Laboratories in South Carolina, and the Florida Board of Conservation Marine Laboratory.

The director of the Virginia Institute of Marine Science stated that the Institute through the work of Dexter S. Haven, head of the Department of Applied Science, has pioneered in basic research leading to these studies as early as 1959. The Institute's director said, "From his work, Haven found that both wheat flour and cornstarch when fed to oysters in quantities as low as 5 parts per million increased the yields or the 'fatness' of oyster meats over that of oysters feeding on natural foods in river water." The results of those studies were reported to scientists in talks presented during conventions in 1961 and 1963 and were published in Chesapeake Science in March 1965.

It was stated that Haven anticipates conducting further feeding experiments in 1966 in which oysters will be held in salt-water tanks or ponds where their diet can be supplemented with starch. The outcome of this work will indicate whether or not it may be economically feasible to feed oysters before offering them to the raw bar trade, or possibly to employ supplemental feeding to increase yields in commercial production of oysters.

A scientist of the Bears Bluff Laboratories in South Carolina has for several years explored the use of tidal ponds for oyster culture. He began supplemental feeding of oysters in tanks in 1963. Instead of using starch, he has tested the use of rice chaff and rice, both local products of South Caro-

lina. His preliminary experiments indicate that oysters gain weight when either rice chaff or rice is added to water flowing over them.

During the past two years, a team of scientists at the Florida Board of Conservation Marine Laboratory fed oysters pulverized corn meal as a source of starch, and their reports confirm Haven's earlier studies showing that there is a spectacular increase in the fatness of oysters fed that diet. When asked if he anticipates that the quality and flavor of oysters can be improved with special additives to oysters' natural diet, Haven said that this could only be found out by conducting the experiments which he planned in 1966.

Haven believes that the techniques he has developed for feeding oysters may be useful to biologists who need to hold oysters under laboratory conditions with a minimum flow of river water. Oyster biologists at the Virginia Institute of Marine Science are exploring the use of the technique in keeping oysters in spawning condition throughout the winter by using starch for supplemental feeding. This is contributing to several phases of oyster research now in progress at the Institute's Gloucester Point laboratory. (Virginia Institute of Marine Science, December 15, 1965.)



Salmon

U.S. PACIFIC COAST CANNED STOCKS, DECEMBER 1, 1965:

On December 1, 1965, canners' stocks (sold and unsold) in the United States of Pa-

cific canned salmon totaled 2,478,058 standard cases (48 1-lb. cans)--136,811 cases less than on November 1, 1965, and 661,996 cases less than on December 1, 1964, when stocks totaled 3,140,054 standard cases.

On the basis of total stocks of 3,292,378 actual cases (consisting of cans of $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., 1-lb., etc.), red salmon accounted for 1,902,932 cases (mostly 1-lb. and $\frac{1}{2}$ -lb. cans) or 57.8 percent of the total canners' stocks on December 1, 1965; pink salmon accounted for 767,120 cases or only 23.3 percent (499,786 cases were 1-lb. talls). Next came chum (305,471 cases, mostly 1-lb. talls), followed by coho or silver (193,729 cases), and king salmon (123,126 cases).

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965, the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

Shipments at the canners' level of all salmon species from July 1 to December 1, 1965, totaled 1,796,704 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses): king, 95,503 standard cases (78,155); red 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 94 percent of the 1965 salmon pack. (Division of Statistics and

Species	Dec. 1, 1965	Nov. 1, 1965	Dec. 1, 1964
	(No. of Actual Cases)		
King.	123,126	140,743	94,648
Red.	1,902,932	1,983,736	674,711
Coho.	193,729	232,458	222,095
Pink.	767,120	793,674	1,977,112
Chum.	305,471	328,219	782,844
Total.	3,292,378	3,478,830	3,751,410

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 $\frac{1}{4}$ -lb.	6,798	244,715	66,770	4,165	66	322,514
48 $\frac{1}{2}$ -lb.	99,439	675,335	74,064	234,214	61,817	1,144,869
48 1-lb.	16,592	976,829	42,839	499,786	234,017	1,770,063
12 4-lb.	297	6,053	10,056	28,955	9,471	54,932
Total.	123,126	1,902,932	193,729	767,120	305,471	3,292,378

Table 3 - Cannery Shipments from July 1, 1965, to December 1, 1965, By Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
48 $\frac{1}{4}$ -lb.	7,402	180,333	58,068	4,328	1	250,132
48 $\frac{1}{2}$ -lb.	69,413	307,680	58,484	178,126	32,275	645,978
48 1-lb.	4,139	483,794	65,261	549,851	264,526	1,367,571
12 4-lb.	42	3,406	4,213	28,984	7,050	43,611
Total	80,912	975,213	186,026	761,289	303,852	2,307,292

Economics, National Cannery Association, December 29, 1965.)

Note: See Commercial Fisheries Review, January 1966 p. 46.



South Atlantic Fisheries Explorations and Gear Development

ROYAL-RED SHRIMP GROUNDS OFF FLORIDA COAST SURVEYED:

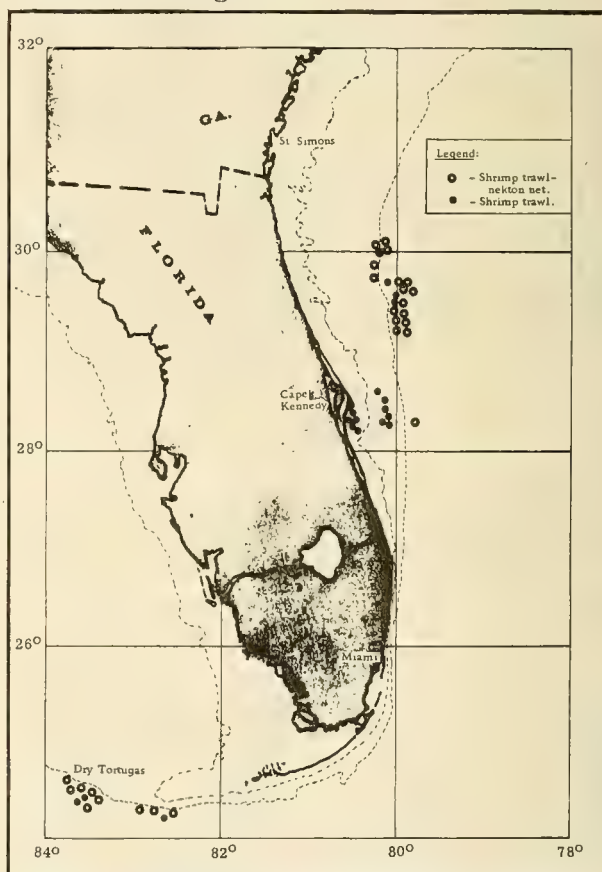
M/V "Oregon" Cruise 105 (November 17-December 3, 1965): A seasonal assessment of the royal-red shrimp (*Hymenopenaeus robustus*) stocks on grounds off St. Augustine, Fla., and the Dry Tortugas was made during this 17-day cruise. Another objective of the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon was to evaluate the related marine life communities of the continental slope area.

During the explorations, trawling transects using 40-foot flat trawls were conducted from 100 to 400 fathoms in each area covered; 65-foot flat trawls were used to determine shrimp abundance where good concentrations were indicated.

On the St. Augustine beds, good catches of royal-red shrimp were made in 185 to 200 fathoms. The best 3-hour drag yielded 125 pounds of heads-off shrimp in 195 fathoms. Ten 3-hour drags on those grounds yielded a total of 490 pounds of heads-off shrimp. Although shrimp ranged widely in size and were larger in deeper water, they averaged 36-40 count throughout the grounds. Catches of 15 to 55 pounds (heads-on) of the Florida lobsterette (*Nephropsis aculeata*) were taken concurrently with royal-red shrimp.

Royal-red shrimp were not located in commercial concentrations off the Dry Tortugas. Temperature transects through that area revealed that ideal bottom temperatures for royal-red shrimp (50° F.) were uniformly distributed between the 150- and 300-fathom curves. Such a condition usually results in

population scatter. Trawling transects from 100 to 400 fathoms bore out this relationship as royal-red shrimp were taken as deep as 340 fathoms. The best catch yielded 15 pounds of heads-off shrimp (21-25 count) in a 3-hour drag using a 40-foot flat net. Shrimp caught off Dry Tortugas averaged a larger size than those off St. Augustine.



Station pattern of M/V Oregon Cruise 105 (November 17-December 3, 1965).

Several drags were made off Cape Kennedy in 28 to 38 fathoms to locate brown shrimp (*Penaeus aztecus*) with catches light and scattered. Large white shrimp (*Penaeus setiferus*) of 16-20 count were taken in 6 to 8 fathoms, averaging 25 pounds of heads-off shrimp per hour drag with a 40' flat trawl.

Deep-water drags in both areas worked yielded small quantities of whiting (*Merluccius albidus*), hake (*Urophycis regius*), and two species of rattails (*Coelorhynchus carminatus* and *Nezumia bairdii*). A large school of unidentified fish 2 to 3 fathoms off the bottom was recorded on the depth-finder in 240 fathoms southwest of Key West during one drag. Off St. Augustine, canchroid crab (*Cancer borealis*) were taken in quantities up to 175 pounds per 3-hour drag.

One-meter nekton-net stations yielded several juvenile swordfish (*Xiphias gladius*) and large numbers of juvenile dolphin (*Coryphaena* sp.), mullet (*Mugil* sp.), and lanternfish (*Myctophidae*).

Seven little tuna (*Euthynnus alletteratus*) and 4 skipjack (*Katsuwonus pelamis*) were caught on trolling lines. A few small schools of both species were seen off Cape Kennedy, and a single small school of little tuna was observed off the Dry Tortugas.

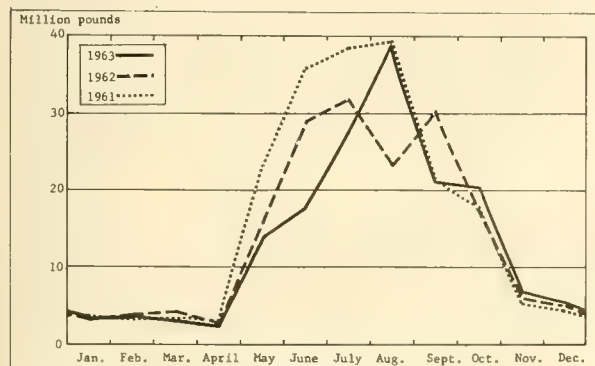
Note: See *Commercial Fisheries Review*, May 1965 p. 37.



Texas

FISHERY LANDINGS, 1964:

Summary: Commercial landings of fish and shellfish at Texas ports in 1964 were 145.1 million pounds with an ex-vessel value of \$29.5 million. That was a drop of 21.3 million pounds and \$539,000 from 1963. Decreased landings in the menhaden and shrimp fisheries were the main reason for the decline.



Texas landings by months, 1961-63.

Shrimp: Texas landings of headless shrimp in 1964 amounted to 41.6 million pounds (66.1 million pounds, heads-on) with an ex-vessel value of \$26.1 million. That was a decrease

of 2.5 million pounds and \$447,000 from 1963. However, Texas remained the top shrimp-producing State and accounted for 37 percent of the quantity and 42 percent of the value of domestic shrimp landings at Gulf of Mexico ports in 1964.

Brown shrimp continued to dominate the annual Texas harvest with 1964 landings of 25.9 million pounds (heads-off) valued at \$16.8 million. The species made up 62 percent of total Texas shrimp landings in 1964 compared with 71 percent in 1963 and 69 percent in 1962. Waters along the Texas coast produced 19.9 million pounds of brown shrimp in 1964 compared with 25.9 million pounds in 1963. Landings of brown and pink shrimp from the high seas off Mexico totaled 9.2 million pounds (heads-off) compared with 7.5 million pounds in 1963. White shrimp landings were the highest on record since the beginning of the collection of detailed shrimp statistics in 1956. The bay systems along the coast produced 51 percent of the 1964 white shrimp catch. No commercial landings of seabob were reported in 1964.

The Brownsville-Port Isabel area accounted for 33 percent of the 1964 Texas shrimp landings; Aransas Pass-Rockport, 23 percent; Freeport, 22 percent; Galveston Bay area, 14 percent; and Port Arthur-Sabine Pass, 8 percent.

The average ex-vessel value of headless shrimp at Texas ports in 1964 was 63 cents a pound compared with 60 cents in 1963 and 77 cents in 1962.

In 1964, U. S. companies had fishing and processing permits in several Central and South American areas. Such activity was on a large scale in both number of vessels engaged and the magnitude of processing capabilities. Foreign operations have become an integral part of the supply complex of the Texas shrimp industry.

Oysters: In Texas the oyster fishery ranked third in volume of landings and second in value in 1964. Fishermen harvested a record 3.4 million pounds of oyster meats valued at \$1.1 million. That was 739,000 pounds greater than the record quantity produced in 1963. The yield of select quality meats from public reefs averaged about two gallons a Texas barrel (296 pounds shell weight). There were no reports of "oyster kill" or meat discoloration during the year. Galveston and

Trinity Bays accounted for 87 percent of the State's total harvest; San Antonio Bay, 8 percent; and the remainder from 3 other areas along the coast. About 275 oyster-dredge units and several tong crews worked in the State for about 5 months during the year.

Blue Crab: In 1964, Texas blue crab landings of 2.5 million pounds valued at \$176,000 were below the 3.0 million pounds valued at \$200,000 in 1963. Production areas shifted to bays in northern Texas with 60 percent of the catch coming from the Galveston-Sabine areas and being trucked to processing plants along the coast. Four regular processors and two smaller plants operated in 1964, although none received the desired volume of crab at any time during the year.

Edible Finfish: Landings of edible finfish in 1964 amounted to 6.4 million pounds valued at \$1.3 million, compared with 6.6 million pounds valued at \$1.3 million in 1963. Red snapper landings in 1964 of almost 2.3 million pounds were only 2 thousand pounds below the record landings of 1908. Landings of spotted sea trout totaled 978,000 pounds valued at \$252,000 compared with 1.2 million pounds valued at \$302,000 in 1963. Black drum landings remained at the 1962-63 level of 1.4 million pounds despite the cancellation of contract drum netting in the Laguna Madre early in 1964. In recent years the closing of more inshore waters to net fishing has caused a general decline in the volume of domestic edible finfish landings.

Vessel Construction: The building of new fishing vessels continued at a rapid pace

throughout 1964 when 64 new vessels were documented in Texas. Some of those vessels were taken to Caribbean and South American countries for use in the shrimp fishery. However, all will maintain U. S. registration and be manned by U. S. citizens. Texas shipbuilders at Aransas Pass, Freeport, Port Isabel, and the Galveston-Port Arthur area have established a "custom-made" trend in shipbuilding with the size, material, and hull design adapted to the individual needs of the purchasers. Vessels to be used as long-range craft were specifically constructed for fishing offshore under adverse conditions.

Thirty-four vessels were removed from documentation in 1964. Most of those were lost at sea. Four Texas vessels were sold and transferred to foreign flags.



Tuna

U. S. PACIFIC COAST ALBACORE FISHING SEASON FOR 1965 ENDS:

Strong southwesterly winds and near-record rainstorms prevailed along the entire West Coast during November 1965. High winds and rough to very rough seas kept the Pacific Northwest albacore tuna fishing fleet tied at dockside.

The 60-degree F. sea surface isotherm remained close to the coast from Cape Mendocino south to Point Conception, and albacore fishing was good off Morro Bay and Davidson Seamount whenever winds and seas

Texas Fishery Landings, 1963-1964

Species	1964		1963	
	Quantity Pounds	Value Dollars	Quantity Pounds	Value Dollars
Fish:				
Menhaden.	66,686,400	822,024	83,735,900	1,034,170
Snapper, red	2,249,800	631,200	2,168,700	590,440
Sea trout, spotted.	977,700	251,681	1,190,200	301,601
Drum:				
Black	1,409,300	124,508	1,362,700	106,935
Red (redfish)	446,900	111,793	685,600	165,878
Other fish	1,381,800	172,448	1,332,200	158,702
Total Fish	73,151,900	2,113,654	90,475,300	2,357,726
Shellfish:				
Crabs, blue	2,484,800	175,552	2,982,200	199,968
Oysters	3,357,100	1,092,582	2,617,900	913,835
Shrimp (heads-on):				
Brown and pink	47,432,400	18,969,673	55,811,100	21,752,846
White	18,617,100	7,173,287	13,719,500	4,805,748
Other	3,600	1,151	700,800	32,899
Squid	23,500	2,350	37,400	3,884
Total Shellfish	71,918,500	27,414,595	75,868,900	27,709,180
Grand Total	145,070,400	29,528,249	166,344,200	30,066,906

Note: Oysters are reported in pounds of meats (8.75 pounds per gallon). All other species are shown in round weight. The weight of heads-on shrimp was determined by multiplying heads-off weight by the following factors: brown 1.61; pink 1.60; white 1.54, royal-red 1.80; and seabob 1.53.

abated. Landings continued to rise in southern California, and by the end of November totaled 10,730 tons.

Albacore landings at Pacific Northwest ports during the 1965 season were estimated at about 7,500 short tons. Canneries in Astoria, Oreg., took about 6,500 tons; canneries in Seattle, Aberdeen, and Anacortes probably took all of the remainder.

Total albacore tuna landings for the West Coast during the 1965 season were about 18,230 tons, ranking just below the average over the 21-year postwar period. The season could well have been the poorest on record, had it not been for the Pacific Northwest landings, which were among the highest on record since World War II. The California albacore fishery in 1965 was the poorest season since 1947.

Note: See Commercial Fisheries Review, November 1965 p. 36.

* * * * *

RECORD SIZE ALBACORE CAUGHT OFF HAWAII:

The largest albacore tuna known to science turned up during late 1965 in the Honolulu fish auction market in Hawaii. It was a male that weighed a whopping 98 pounds; the previous record was set in 1955 by another male that weighed 93 pounds.

The fish was spotted by a biological technician of the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu. The laboratory technician attends the pre-dawn fish auction daily to sample the Hawaiian catch. "I've worked around albacore before, in the Laboratory's sampling station in Samoa but the minute I saw it, I knew I never saw an albacore that big before," he said. The fish measured 128.4 centimeters (about 4 feet 2 inches) long. The fish was caught by the vessel Ilima, fishing out of Hilo, Hawaii.

What interests fishery biologists at the Bureau's Honolulu Laboratory more than the establishment of a new world record, is the fact that the big fish affords one more clue to the existence near the State of Hawaii of a population of very large albacore tuna. The previous record fish was also caught off Hawaii, and albacore taken in the Hawaiian fishery average larger than those taken in the major fisheries--those off the United States coast and off Japan. According to a fishery biologist at the Bureau's Honolulu Biological

Laboratory, Hawaiian fishermen catch less than 10 tons of albacore tuna a year. About 60,000 tons a year are taken by the Japanese in the Pacific Ocean and about 25,000 tons by the mainland U. S. fisheries.

The Bureau biologist and other scientists have established the fact that the Japanese and American fisheries draw upon a common stock. Albacore tagged off the Pacific northwest have turned up in the Japanese catch. It is the Bureau biologist's theory that the albacore spawn in the tropical Pacific and then migrate to the north temperate Pacific. For several years, they remain in the temperate eastern Pacific or cross the Pacific to mingle with the albacore off Japan. Late in their lives they reach sexual maturity and return to the warm waters of the tropics to spawn. It is this old, spawning stock that the Hawaiian fishery samples, the biologist says. Evidence that the albacore spawn in warm seas comes from finding very young but recognizable albacore in the stomachs of predatory billfish landed near Hawaii.

The age of the record albacore specimen recently caught is estimated at about 14 years. Its weight of 98 pounds far exceeds the Hawaiian average of about 70 pounds, which itself is far above the 20 to 30 pounds of the U. S. and Japanese fisheries. The fish was caught at a depth of about 350 feet.

The record size fish created little stir in the auction market. The fishermen recognized it as being exceptionally large, but said that in the past they had taken even larger ones that were unreported. The fish was auctioned off and wound up that evening on Honolulu dinner tables.



U. S. Fishing Vessels

FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, OCTOBER 1-DECEMBER 31, 1965:

From the beginning of the program in 1956 through December 31, 1965, a total of 1,728 applications for \$44,070,515 was received by the U. S. Bureau of Commercial Fisheries, the agency administering the Federal Loan Fund. By that date, 896 applications (\$19,612,154) had been approved, 558 (\$13,116,964) had been declined or found ineligible, 229 (\$8,524,758) had been withdrawn by the applicants before

being processed, and 45 (\$784,751) were pending. Of the applications approved, 328 were approved for amounts less than applied for--the total reduction was \$2,031,888.

The following loans were approved from October 1 through December 31, 1965:

New England Area: Raymond F. Stoddard, Portland, Me., \$4,670; Trawler Notre Dame, Inc., Chelsea, Mass., \$50,000; and Manuel F. Roderick, Inc., Stoneham, Mass., \$60,000.

South Atlantic and Gulf Area: Louis E. Wiegand, Miami, Fla., \$15,000.

California: James M. Battle, Eureka, \$6,630.

Pacific Northwest Area: Calvin W., Nellie I., and Caral E. Johnson, Astoria, Oreg., \$23,082; James H. and Leola E. Baumgartner, Coos Bay, Oreg., \$15,000; Kenneth N. Holland, Anacortes, Wash., \$10,092; Edward B. and Myrtle L. Kary, Ilwaco, Wash., \$15,750; Michael J. Carr, Mercer Island, Wash., \$10,751; Herbert O. Bromley, Port Townsend, Wash., \$6,000; and L. H. Chaney, Seattle, Wash., \$9,000.

Alaska: Roman Cabanilla, Cordova, \$8,000; J. A. Rollin, Cordova, \$5,300; Perry C. and Julia R. Coburn, Ketchikan, \$24,000; Harold T. and Mavis Irene Hendricksen, Ketchikan, \$5,000; Philip C. Hoffman, Ketchikan, \$3,500; Charles A. McVicker, Ketchikan, \$9,000; Jones Paul Hotch, Klukwan, \$4,000; Hans Broadland, Petersburg, \$10,000; Neal J. and Jan P. MacDonald, Petersburg, \$29,600; and Paul I. Olson, Petersburg, \$6,000.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the fourth quarter of 1965, a total of 8 applications for \$635,100 was received. Since the program began (July 5, 1960), 94 applications were received for \$8,564,495. Of the total, 74 applications were approved for \$5,487,187 and 11 applications for \$1,389,900 were pending as of December 31, 1965. Since the mortgage insurance program began, applications received and approved by area are:

New England Area: Received 14 (\$1,646,750), approved 10 (\$1,217,178).

California: Received 2 (\$1,262,000), approved 2 (\$1,262,000).

South Atlantic and Gulf Area: Received 61 (\$3,509,024), approved 53 (\$2,416,939).

Pacific Northwest Area: Received 12 (\$2,071,125), approved 5 (\$526,296).

Alaska: Received 5 (\$75,596), approved 4 (\$64,774).

The first applications for a Fishing Vessel Construction Differential Subsidy under the Bureau's expanded program were received in December 1964. Through December 31, 1965, a total of 55 applications for \$11,638,500 had been received. Public hearings on 34 applications were completed during that period and 8 invitations to bid on a vessel were sent out.



U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-December 4, 1965, amounted to 43,649,271 pounds (about 2,078,536 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 2.0 percent from the 42,801,114 pounds (about 2,038,148 standard cases) imported during January 1-November 28, 1964.

The quantity of tuna canned in brine which could be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty was limited to 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota would have been dutiable at 25 percent ad valorem.



Washington

CHANGE PROPOSED IN LEGAL DEFINITION OF COMMERCIAL SALMON TROLLING GEAR:

At a public hearing held in Olympia, Wash., December 18, 1965, by the Washington State Department of Fisheries, proposed changes discussed in the 1966 sport fishing regulations for food fish included a proposal to redefine commercial salmon trolling gear.

It was proposed that the legal definition of commercial salmon trolling gear be changed so that it would be unlawful to troll for salmon commercially with gear that is not permanently fixed or fastened to the vessel. Under the new definition, gear commonly used in salmon angling would not be legal in commercial salmon trolling.

Following public comment on the proposals, final regulations were to be adopted at another public meeting scheduled for December 21. (Washington State Department of Fisheries, December 3, 1965.)

* * * * *

SPORT SALMON FISHERMEN BARRED FROM COMMERCIAL FISHERY:

A new Washington State regulation makes it unlawful to troll for salmon commercially with gear that is not fixed or fastened to the vessel.

The new regulation is designed to close what might be called a "loophole," through which the 3-fish limit for Washington sport salmon fishermen could be circumvented by the device of obtaining a commercial trollers' license under which the licensee could take as many salmon as he wished.

"The practice of catching salmon on sport gear and selling them," the Director of the Washington Department of Fisheries said, "is growing at a rapid rate and if not curtailed now would soon create a severe management problem. This growth includes all sizes of 'comm-sport' boats, including the large, modern sport charter vessels which carry thousands of anglers each year. Our goal is to make available to our citizens the maximum sustained benefits from the fisheries resource. We feel that the primary product of our sport fishery is recreation and adherence to the 3-fish bag limit in the recreational fishery brings about sharing of the sport catch among greater numbers of the angling public. . . . Under the new regulation, the serious small-boat commercial troller may continue fishing by switching to the use of fixed gear."

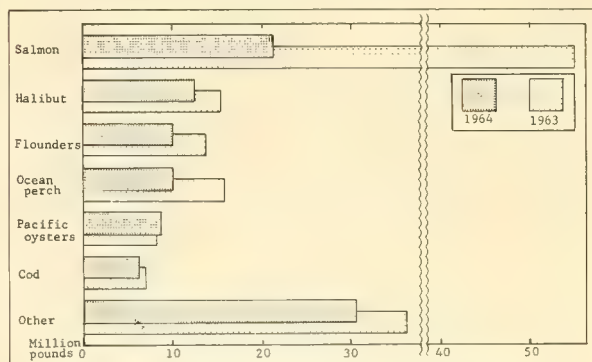
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LANDINGS OF FISH AND SHELLFISH, 1963-1964:

The 1964 commercial landings of fish and shellfish in Washington State totaled 100.9

million pounds with an ex-vessel value of \$15.6 million, a decline of 33 percent in quantity and 27 percent in value from 1963. Salmon was the leading species in 1964, followed by halibut, flounder, ocean perch, and Pacific oysters.

Salmon: The 1964 salmon catch in Washington totaled 21.3 million pounds valued at \$6.5 million, a drop of 61 percent in quantity and 42 percent in value from the previous year. The decline was due mainly to an off-cycle year for pink salmon in 1964 and a light catch of sockeye salmon. Also, the catch of king salmon declined from 6.4 million pounds in 1963 to 5.6 million pounds in 1964. But the catch of silver salmon jumped from 6.1 million pounds in 1963 to 9.4 million pounds in 1964. The chum salmon catch amounted to about 3.1 million pounds in both years.



Washington landings of fish and shellfish, 1964 and 1963.

Halibut: The 1964 landings of halibut in Washington (by United States fishermen) totaled only 12.1 million pounds valued at \$2.3 million as compared with 15.4 million pounds valued at \$2.7 million in the previous year.

Bottomfish: The otter-trawl fleet also reported a general decline in landings of most species in 1964. The 1964 landings included flounder 11.3 million pounds (13.3 million in 1963), ocean perch 11.3 million pounds (15.6 million in 1963), true cod 6.2 million pounds (6.3 million in 1963), and rockfish 5.9 million pounds (8.0 million in 1963).

Shellfish: The 1964 shellfish landings consisted mostly of 8.2 million pounds of oyster meats valued at \$2.2 million (about the same as in 1963) and 5.2 million pounds of Dungeness crab valued at \$1.1 million (down 23 percent in quantity and 21 percent

in value from 1963). The shellfish landings also included small quantities of clams and shrimp.

Note: See Commercial Fisheries Review, May 1964 p. 36.



Wholesale Prices

EDIBLE FISH AND SHELLFISH, DECEMBER 1965:

There was a general downward trend in prices from November to December 1965 and the wholesale price index for edible fishery products was down slightly. At 119.3 percent of the 1957-59 average, the overall index in December 1965 was down 0.1 percent from the previous month. The exception to generally lower December prices for fresh and frozen fish and shellfish was in canned fish prices, some of which advanced from the previous month. As compared with the same month a year earlier, the index for December 1965 was up 8.9 percent because of higher prices for nearly all items.

December 1965 prices were down from the previous month for ex-vessel large haddock (down 16.6 percent) and at New York City for fresh round yellow pike (down 8.4 percent). Those lower prices were only partly offset by higher prices at Chicago for Lake Superior fresh whitefish (up 8.7 percent) and a slight increase in prices for frozen western dressed halibut. As a result, the subgroup index for drawn, dressed, or whole finfish dropped 4.0 percent from November to December. As compared with December 1964, the subgroup index for December 1965 was up 11.0 percent. December 1965 prices for all items in the subgroup ranged from high to sharply higher than a year earlier--up 20.2 percent for ex-vessel haddock, 19.2 percent for frozen halibut, and 22.6 percent for Great Lakes whitefish.

In the subgroup for fresh processed fish and shellfish, prices for fresh haddock fillets in December were down 8.4 percent from the previous month. Prices for other items in the subgroup were unchanged. The subgroup index dropped 0.6 percent from November to

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, December 1965 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			Dec. 1965	Nov. 1965	Dec. 1965	Nov. 1965	Oct. 1965	Dec. 1964
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					119.3	119.4	118.0	109.5
<u>Fresh & Frozen Fishery Products:</u>					120.6	122.7	121.1	113.8
Drawn, Dressed, or Whole Finfish:					123.4	128.5	131.9	111.2
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.35	.18	119.6	143.4	181.0	99.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.48	141.0	140.5	142.0	118.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.88	122.3	122.3	117.0	115.6
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.63	.58	93.3	85.8	78.3	76.1
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.71	.78	116.2	126.9	99.9	114.6
<u>Processed, Fresh (Fish & Shellfish):</u>					123.5	124.2	119.1	111.9
Fillets, haddock, sml., skins on, 20-lb. tins . . .	Boston	lb.	.44	.48	105.7	115.4	119.0	109.3
Shrimp, lge. (26-30 count), headless, fresh . . .	New York	lb.	.91	.91	106.6	106.6	101.4	105.5
Oysters, shucked, standards	Norfolk	gal.	8.75	8.75	147.6	147.6	141.2	120.1
<u>Processed, Frozen (Fish & Shellfish):</u>					110.6	110.9	107.6	112.8
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.41	101.4	103.9	100.1	92.5
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	115.8	117.3	117.3	115.8
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	112.2	112.2	107.0	105.2
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.91	.91	107.9	107.3	102.6	113.8
<u>Canned Fishery Products:</u>					117.5	114.0	113.0	102.2
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	27.50	27.00	119.8	117.7	117.7	92.6
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.25	11.56	108.8	102.6	102.6	102.6
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	121.9	123.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

December but was up 10.4 percent from December 1964 principally because of sharply higher prices in December 1965 for standard shucked oysters (up 22.9 percent).



Dressing fish aboard a New England trawler.

Prices for frozen fillets in December 1965 were generally lower than in the previous month. The subgroup index for frozen processed fish and shellfish at 110.6 percent of the 1957-59 average dropped 0.3 percent from the preceding month. Prices were lower than

in November for frozen flounder fillets (down 2.4 percent) and small haddock fillets (down 1.3 percent). Frozen shrimp prices at Chicago were up slightly from the previous month. The subgroup index in December was down 2.0 percent from the same month a year earlier. While prices of some species of frozen fillets were higher than in December 1964, frozen shrimp prices at Chicago in December 1965 were down 4.8 percent from December a year earlier.

The December 1965 subgroup index for canned fishery products rose 3.1 percent from the previous month. Prices for canned pink salmon in December were 1.8 percent higher than in November because of this past season's short pack, and there were indications of a much stronger market for canned tuna (prices up 6.0 percent from November to December). Prices for other canned fish products in the index were unchanged from November. As compared with December 1964, the subgroup index for December 1965 was up 15.0 percent--prices for canned pink salmon were 29.4 percent higher because stocks were more limited than a year earlier. Prices also were higher than a year earlier for California jack mackerel (up 14.2 percent), canned tuna (up 6.0 percent), and canned Maine sardines (up 2.5 percent).



NEW HYDROFOIL CRAFT TO BEGIN PASSENGER SERVICE

A new chapter in maritime history was made in Baltimore, Md., when the forerunner of a fleet of fast, 75-passenger hydrofoil craft hit the water for the first time. Named HS Victoria, the ship can hit 40 knots top speed when "foilborne," and was expected to go into service in fall 1965 between Seattle, Wash., and Victoria, B. C. This past summer she underwent sea trials in Chesapeake Bay.

HS Victoria is 64 feet 9 inches long, has a range of 180 nautical miles and carries a crew of three. Resting on her hull, the craft draws more than 14 feet, but when up on her foils can skim over the surface with a draft of 7 feet 6 inches. The hydrofoil is powered by twin gas turbines.

The new ship, when in passenger service, will make three 75-mile round trips a day. The owners say the vessel is the predecessor to a fleet of such craft planned for operation between major port cities in the United States and abroad.

The basic concept of a hydrofoil is a ship on stilts, 2 aft and 1 forward. Each stilt has a pontoon on the bottom. The ship rests on the hull at slow speeds and rises on the foils as momentum is picked up. The HS Victoria was built by a Baltimore shipyard. (Science News Letter, August 7, 1965.)



FOREIGN

International

CODEX ALIMENTARIUS COMMISSION

THIRD SESSION MEETS IN ROME, OCTOBER 19-29, 1965:

The Third Session of the Codex Alimentarius (Food Standards) Commission met in Rome, October 19-29, 1965. The Commission is sponsored by the Food and Agriculture Organization (FAO) and the World Health Organization (WHO). The joint FAO/WHO program on food standards has as its purpose: (1) simplifying and integrating food standards work now carried on by many international organizations; (2) providing an effective mechanism for obtaining Government acceptance of those standards; and (3) their publication in the Codex Alimentarius.

Important actions at the Third Session of the Commission were (1) the establishment of a Codex Committee on Fish and Fishery Products, and (2) the adoption of a report on "General Principles of the Codex Alimentarius."

Codex Committee on Fish and Fishery Products: The Commission agreed to establish a Codex Committee on Fish and Fishery Products. Norway volunteered to be the host country and to provide the Chairman for the new Committee and was confirmed in that role.

The following terms of reference for the Codex Fisheries Committee were agreed upon: "The Codex Committee on Fish and Fishery Products should elaborate worldwide standards for all fresh, frozen, and otherwise processed fish, mollusks, and crustaceans."

The relation of the Fisheries Committee with other Codex Committees was stated as follows: "The Fisheries Committee will have liaison with the Frozen Foods Committee, as it will have with those for Food Hygiene, Additives, Labeling, and Sampling, and Analytical Methods--but only as to Codes of Practice--not as to the elaboration of the Codex Standards."

Arrangements were made for an orderly transition of work on fisheries standards from the FAO Fisheries Division (previously assigned such responsibility by the Codex Commission) to the new Codex Fisheries Committee. As of January 1, 1966, FAO was to transfer the work, and all files relating to the fish standards drafts, to the Committee.

In an informal discussion between the several fisheries representatives in attendance it was agreed that the first meeting of the Codex Fisheries Committee might be timed to take advantage of the presence in Europe of many country representatives for the Second International Congress of Food Science and Technology at Warsaw, Poland, August 22-27, 1966.

On the agenda at the first meeting of the Codex Fisheries Committee will be the establishment of rules of procedure, patterned after the guidelines already in use by other Codex Committees. It is expected that priorities for particular fishery products Codex Standards can be agreed to, and also assignments of each priority standard to 2 or 3 countries indicating interest in serving as a working group. Those working groups would report back to the full Committee when a Codex Standard had been sufficiently developed to warrant review by that Committee.

General Principles of the Codex Alimentarius: Other action by the Commission at the Third Session included the adoption of a report by the Codex Committee on General Principles which met in Paris, October 4-8, 1965. The report as adopted by the Commission included the following provisions:

GENERAL PRINCIPLES OF THE CODEX ALIMENTARIUS

"Purpose of the Codex Alimentarius: The Codex Alimentarius is a collection of internationally adopted food standards presented in a uniform manner. These food standards aim at protecting consumers' health and ensuring fair practices in the food trade. Their publication is intended to guide and promote the elaboration

International (Contd.):

and establishment of definitions and requirements for foods, to assist in their harmonization, and in so doing to facilitate international trade.

"Scope of the Codex Alimentarius: The Codex Alimentarius is to include standards for all the principal foods, whether processed, semiprocessed, or raw, for distribution to the consumer. Materials for further processing into foods should be included to the extent necessary to achieve the purposes of the Codex Alimentarius as defined. The Codex Alimentarius is to include provisions in respect of food hygiene, food additives, pesticide residues, contaminants, labeling and presentation, methods of analysis, and sampling.

"Nature of Codex Standards: Codex Standards contain requirements for food aimed at ensuring for the consumer a sound, wholesome food product free from adulteration, correctly labeled and presented. In particular, a Codex Standard for a given food product lays down the special requirements for that product, it being understood that the general provisions contained in the Codex Alimentarius shall apply except to the extent otherwise expressly provided for in a specific standard.

"A Codex Standard should, therefore, for any food or foods: (1) incorporate by reference the applicable hygiene, labeling, methods of analysis, and other general provisions adopted by the Commission; and (2) specify in whole or in part the following criteria, as appropriate:

(a) Product designation, definition, and composition--These should describe and define the food (including its scientific name when necessary) and cover compositional requirements which may include quality criteria.

(b) Hygiene requirements--These should include such factors as specific sanitary and other protective measures and safeguards to assure a sound, wholesome, and marketable product.

(c) Weight and measure requirements, such as fill of container, weight, measure, or count of units based on an appropriate method or criterium.

(d) Labeling requirements--These should include specific requirements for labeling and presentation.

(e) Sampling, testing, and analytical methods--These should cover specific sampling, testing, and analytical procedures.

"Acceptance of Codex Standards: A Codex Standard so defined may be accepted by a country--in respect of trade and distribution of the food within its territory--in its entirety, or accepted with a declaration of more stringent requirements, or accepted as a target which will be put into effect after a stated number of years. Acceptance in its entirety or target acceptance would imply an undertaking by the importing country not to hinder within its territorial jurisdiction the distribution of food which conforms to the standard by any legal provisions relating to the health of the consumer or to other food standard matters."

Note: See Commercial Fisheries Review, Sept. 1965 p. 55, Dec. 1964 p. 75.

NUTRITION

SEVENTH INTERNATIONAL CONGRESS OF NUTRITION TO MEET IN HAMBURG:

The VIIth International Congress of Nutrition will meet in Hamburg, Germany, August 3-10, 1966. A scientific program covering many aspects of nutrition has

been planned. Of particular interest to the fishing industry will be discussions and reports on (1) food habits, food patterns, and food taboos; (2) influence of imported foods on the nutritional status of developing countries; (3) methods of protein evaluation; (4) irradiation of foodstuffs; and (5) food from the sea as related to world nutrition in the future. A wide variety of other topics of general interest will also be presented. Official languages for the Congress will be German, English, and French.



Additional information may be obtained from the VIIth International Congress of Nutrition, Secretariat General, Martinistr. 52, 2000 Hamburg 20, West Germany.

COD

FRANCE HOLDS INTERNATIONAL CONFERENCE ON COD INDUSTRY:

A "First International Congress of the Cod Industry: Tradition and Future" was held in Fecamp, France, January 27-29, 1966, under the sponsorship of the Fondation Française d'Etudes Nordiques. The agenda for the meeting called for a discussion of cod fishing and marketing by European countries, particularly as concerns the North Atlantic fishery. Speakers for the meeting were invited from Norway, Denmark, France, West Germany, Spain, Portugal, the United Kingdom, and the Soviet Union. The cod fisheries in each of those countries were reviewed. The meeting also touched on such subjects as the construction of modern trawlers, international conventions affecting cod fishing, and the market for cod in developing countries. Reports and accounts of the discussions were published by the Fondation Française d'Etudes Nordiques.

EUROPEAN TRADE FAIRS

AMERICAN FISHERY PRODUCTS PROMOTED:

Processed fishery products from the United States were vigorously promoted at two

International (Contd.):

important trade fairs in Europe during January 1966, the U. S. Bureau of Commercial Fisheries announced. The products, many of them new to European markets, were displayed at the International Hotel and Catering Show in London January 18-27, and at the U. S. Food and Agricultural Exhibit in Milan, Italy, January 19-25.

Both fairs were expected to attract many of the leading trade people in Europe, including importers, brokers, agents, and buyers. The London show featured portion control of food, and emphasized servings for institutional use. Food products from all over the world were shown at the London fair. The Milan exhibit displayed only American food and agricultural products.

A feature at London was the preparation of fishery products by an internationally famous chef who used recipes approved in the Bureau's test kitchens.

Both the Bureau and the U. S. fishing industry were highly encouraged by successful participation in European fairs held in 1965 at Cologne, West Germany, and Brussels, Belgium, where fishery products were displayed separately from other foods for the first time.

EUROPEAN FREE TRADE ASSOCIATION

INDUSTRIAL TARIFFS REDUCED
ANOTHER 10 PERCENT:

On December 31, 1965, a further cut of 10 percent was scheduled in the level of tariffs on industrial goods traded among the 8 member countries of the European Free Trade Association (EFTA)--Austria, Denmark, Finland, Norway, Portugal, Sweden, Switzerland, and the United Kingdom. But those fishery and agricultural products listed in Annexes D and E to the Stockholm Convention are not included in the industrial goods category.

The latest EFTA tariff cut was scheduled to bring the general level of EFTA tariffs on industrial goods down to 20 percent of their 1960 level. The final 20 percent is to be e-

liminated by a single cut on December 31, 1966, with the exception that Finland (having become associated with EFTA 1 year after the Stockholm Convention came into force) will reach zero at the end of 1967 through successive cuts of 10 percent at the end of 1966 and 1967.

Those tariff reductions will accomplish the establishment of an industrial free trade area among the EFTA countries three years earlier than originally contemplated by the signatories of the Stockholm Convention. (European Free Trade Association, December 8, 1965.)

Note: See Commercial Fisheries Review, March 1965 p. 61.

FISH MEAL

PRODUCTION AND EXPORTS FOR
SELECTED COUNTRIES,
JANUARY-SEPTEMBER 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-September 1965

Country	September		Jan.-Sept.	
	1965	1964	1965	1964
	. . . . (1,000 Metric Tons). . . .			
Chile	3.9	10.2	59.9	108.4
Angola	1/	4.9	2/30.1	42.0
Iceland	14.5	11.4	94.9	89.2
Norway	23.1	9.4	170.7	139.8
Peru	29.8	104.4	1,105.9	1,120.8
So. Africa (including S.-W. Africa)	20.2	23.1	174.9	173.3
Total	91.5	163.4	1,636.4	1,673.5

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-September 1965

Country	September		Jan.-Sept.	
	1965	1964	1965	1964
	. . . . (1,000 Metric Tons). . . .			
Chile	0.9	6.2	51.7	109.7
Angola	1/	4.2	2/26.6	39.9
Iceland	20.5	13.4	105.7	99.9
Norway	20.8	19.7	253.7	154.3
Peru	17.1	56.1	910.1	1,065.7
So. Africa (including S.-W. Africa)	11.4	23.7	261.2	236.8
Total	70.7	123.3	1,609.0	1,706.3

1/ Data not available.

2/ Data available only for January-August 1965.



International (Contd.):

Peru accounted for about 68 percent of the 1.6 million metric tons of fish meal exported by FEO countries in January-September 1965.

* * * * *

WORLD PRODUCTION, SEPTEMBER 1965 WITH CGMPARISONS:

World fish meal production in September 1965 was down 22 percent from the previous month. Peruvian output was very light following the closed fishing season in August. September production declined seasonally in the United States, Norway, and South Africa.

World Fish Meal Production by Countries, September 1965 with Comparisons				
Country	September		Jan.-Sept.	
	1965	1964	1965	1964
..... (Metric Tons)				
Canada	11,547	2,985	64,799	39,696
Denmark	11,184	16,620	91,105	86,571
France	1,100	1,100	9,900	9,900
German Fed. Repub.	6,347	6,521	51,214	57,176
Netherlands	516	1,100	4,379	5,800
Spain	1/	1/	2/13,247	1/
Sweden	511	889	5,401	5,300
United Kingdom ...	5,469	5,185	60,036	58,223
United States.	17,811	20,696	178,423	179,747
Angola	1/	6,376	3/26,561	42,073
Iceland	20,508	15,693	105,702	102,245
Norway	20,814	12,257	253,659	146,815
Peru	17,068	49,478	910,090	1,059,070
So. Afr. (including S.-W. Afr.)	11,356	16,581	261,449	231,073
Belgium	375	375	3,375	3,375
Chile	851	10,777	51,696	114,236
Morocco	1/	4,000	2/1,100	17,250
Total	125,457	170,633	2,092,136	2,158,550

1/Data not available.

2/Data available only for January-May 1965.

3/Data available only for January-August 1965.

Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

World fish meal production in January-September 1965 was slightly less than in the first 9 months of 1964. Peruvian output was down 16 percent and Chilean production was also down sharply, but the decline was partly offset by increased production in Norway, Canada, and South Africa.

Most of the principal countries producing fish meal submit data to the International Association of Fish Meal Manufacturers monthly (see table).

MARINE OILS

WORLD PRODUCTION AND EXPORT FORECAST FOR 1966 WITH COMPARISONS:

Total world production of marine oils (whale, sperm whale, fish, and fish-liver oil)

is forecast at 1,120,000 short tons in 1966 as compared with estimated output of 1,190,000 tons in 1965 and 1,198,000 tons in 1964.

World exports of marine oils is forecast at 715,000 tons in 1966 as compared with estimated exports of 805,000 tons in 1965 and 826,000 tons in 1964. (Fats and Oils Situation, November 1965, U. S. Department of Agriculture.)

FOOD AND AGRICULTURE ORGANIZATION

EXPANSION IN FISHERIES WORK RECOMMENDED AT CONFERENCE:

Plans to expand and intensify the work of the Food and Agriculture Organization (FAO) in the field of fisheries were approved November 25, 1965, by the major program-review body of its biennial Conference in Rome. The Conference's Commission Two, which examines the technical work of FAO, voted 50 to 6 with 3 abstentions, to raise the present Fisheries Division to departmental status. Its recommendation then was to be voted on by the Conference plenary, which is made up of the same member nations.

The recommendation provides for the first steps in an expansion program to be spread over six years. It also incorporates a proposal for setting up a permanent intergovernmental committee which would deal with such problems as harvesting the resources of oceans and inland waters in such a way that they are conserved for future generations.

The director of the present Fisheries Division is Roy Jackson of the United States, who until 1964 was the Executive Director of the International North Pacific Fisheries Commission.

The recommendations to be presented to the Conference ask the FAO Director-General to convene a technical conference on fisheries for West African countries, and another for the Near East some time in 1966-67. (Food and Agriculture Organization, Rome, November 25, 1965.)

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CUBAN PROPOSAL ON FISHING REJECTED AT CONFERENCE:

Cuba urged at the biennial Conference of the Food and Agriculture Organization (FAO) held in Rome, that developed countries "abstain from any interference or harassment" of developing nations fishing in international waters. The recommendation was included

International (Contd.):

in a draft resolution on marine resources submitted to Commission Two of the FAO conference by Cuba's ambassador to the United Nations.

The Commission on November 25, 1965, by a vote of 26 to 10, with 26 abstentions (44 countries were absent), decided that the question raised by Cuba was outside the competence of FAO since it was the subject of an international convention now being ratified under United Nations auspices.

The Cuban draft resolution had recommended that developed countries refrain from making regulations infringing upon "legitimate rights of the developing or emerging countries to exploit international waters adjacent to their territorial seas" but outside the territorial waters of other countries. Cuba's ambassador said he was aware that the proposed resolution was outside the competence of United Nations agencies. However, he said, FAO recognized the potential of marine resources to poor nations, and therefore he was asking the developing countries not to put obstacles in the way of less advanced states. He deplored what he called "political and military reprisals," and said warships should not stop fishing vessels from pursuing their legitimate business. (Food and Agriculture Organization, Rome, November 25, 1965.)

GREAT LAKES

FISHERY PROBLEMS IN THE GREAT LAKES:

Complex fishery situations have arisen in some of the Great Lakes as a result of the decline of the lake trout and other species, and the rise of others such as the alewife. A paper on the problem, using Lake Michigan as an example, was presented before the Management and Research Committee of the Great Lakes Fishery Commission at its 10th Annual Meeting in June 1965 by James W. Moffett, Director of the U. S. Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich.

The paper states in part:

"Fish populations in the Great Lakes have changed significantly in recent years for one or more reasons. Each change has developed problems of adaptation for that particular group of fishermen accustomed to using the resource in a given lake. . . .

"As an example, let us review some of the changes that have occurred in Lake Michigan. These changes are typical of those elsewhere in magnitude, if not in character, and have been most intensively studied.



Fig. 1 - Fish population changes in Lake Michigan are typical of those in the other Great Lakes.

"The Lake Michigan biological community was an extremely delicate and simple one. It depended upon two predatory species in deep water (lake trout and burbot) to hold in balance a large quantity of diverse converters (chubs, sculpins, and smelt) that were moving energy from planktonic into usable vertebrate forms at a rather rapid rate. With the advent of the sea lamprey in Lake Michigan, the lake trout fishery dropped from roughly 6 million pounds per year to nothing in about five years. The burbot population also declined to insignificance. As the lake trout fishery declined the fishermen, in an effort to stay financially solvent, undertook to fish for chubs and the catch curves literally changed places. Approximately 12 million pounds of chubs were produced annually during the late 1950's to replace the 6 million pounds of lake trout that were no longer available to the fishery. Both the fishery and the continuing sea lamprey predation selected for the largest and most rapidly growing chub species.

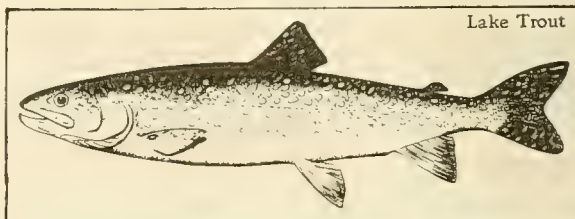


Fig. 2 - Lake Michigan biological community depended upon two predatory species in deep water (lake trout and burbot) to hold in balance a quantity of diverse converters (chubs, sculpins, and smelt).

International (Contd.):

"This brought about a series of biological events which ultimately resulted in the decadence of the chubs to a single species community--eight species dwindled to what is now about 99 percent one species. The smallest and slowest growing species became dominant because of its undesirability to man and to the sea lamprey. Rough calculations of the poundage of chubs needed to feed the annual production of lake trout (6.0 million pounds) made on a 5 to 1 conversion basis suggested that probably 30 million pounds of chubs were left to reproduce or to be caught. We have no idea of the poundage of chubs that was consumed to maintain the standing crop of lake trout but it must have been considerably larger. There were no substitute predators in the lake to utilize these chubs, neither was there a fishery interested in taking them. Consequently, they increased greatly in number.



Fig. 3 - About 12 million pounds of chubs were fished annually during the late 1950's to replace the 6 million pounds of lake trout that were no longer available to the fishery.

"At about the same time the alewife, an exotic above Lake Ontario, spread to Lake Michigan where everything seemed to favor its increase. The size of the still growing alewife population overwhelms the imagination. During certain periods of the year 5 to 8 tons of alewives can be caught within 15 minutes in trawl gear. Unfortunately, with such drastic changes coming so quickly, little or nothing could be done with these animals as far as human economy is concerned.

"The fisheries needed to adapt to these changes and some attempts were made. However, the fishermen ran into a series of difficulties, some of which were their own prejudices. Problems arose in re-outfitting, financing of vessels and plants, development of new markets, . . . etc. The advent of the alewife in Lake Michigan eliminated the herring population that supported a very lively fishery. The chub fishery adjusted to large fish for smoking, became plagued with increasing catches of smaller chubs. The costs of labor to clear gill nets of the more abundant but smaller fish soon overcame the small margin of profit. Since there were no predators to hold the alewives or the smaller chubs in check, the lake soon became characterized by a large biomass of useless animals.

"This situation has been about 15 years in the making. The alewife has not yet had its full effect on the populations of Lake Michigan. The chubs are becoming larger and fewer, but it is not yet clear whether this change can be blamed on the alewife. Since the alewife and chubs are both competitors for the same food and space, it is possible that the chubs may suffer the same fate as the herring. It might be necessary to adjust fishing activities to fit this one species. Alewives are becoming so abundant that when they move into shore to reproduce, they are of such densi-

ties that they displace even the tenacious yellow perch from their accustomed grounds.

"We turn now to the proposition of re-establishing a predator species like the lake trout in this unfamiliar situation. What are we going to do about it? Are we going to stop all fishing activities in the lake to give the planted lake trout the best chance to survive? If we do this, it means that we lose what is left of the fishery.



Fig. 4 - Exhibit showing sea lamprey research and control conducted by the U. S. Bureau of Commercial Fisheries under the supervision of its Ann Arbor (Mich.) Biological Laboratory.

"We have now planted about 1.2 million lake trout in Lake Michigan and it is a bit too late for us to speculate any longer. We are faced with the test. What should we do with the trawl fishery? What should we do with the gill-net fishery? What should we do with the trap-net fishery? Do we allow these to continue? What ways do we have to control them or orient them so they have the least effect on the predator we wish to re-establish--a fish which was the keystone in the economics of the fishery? Many other problems will have to be faced. Undoubtedly, we must be astute and as informed as possible because we are not going to approach these questions and find solutions to these problems without stimulating some public emotionalism. The situation is particularly delicate when we compound it with the problem of making work the ultimate introduction of two species of salmon and also possibly the introduction of striped bass.

"It will require all the study we can possibly put forth. It is going to require all the ingenuity we can devise as a group to balance the situation, keep alive an industry capability and at the same time make possible the achievement of some of the basic objectives to the Great Lakes Fishery Commission." (News Release of Ontario Department of Lands and Forests, Toronto, November 12, 1965.)

Note: See *Commercial Fisheries Review*, September 1965 p. 51.

OCEANOGRAPHY

BIOLOGICAL OCEANOGRAPHIC SECTION
SET UP WITHIN THE INTERNATIONAL
UNION OF BIOLOGICAL SCIENCES:

At the XVth General Assembly of the International Union of Biological Sciences (held

International (Contd.):

in Prague in July 1964), a new section on Biological Oceanography was created within the Union. The new section will cover all branches of marine biology. It is designed to function as a scientific association through which marine biologists of all nations can communicate.

A small committee with a Danish scientist as chairman and a British scientist as secretary has been set up to arrange the first meeting of the section which should be held during the Second International Oceanographic Congress in Moscow in 1966.

It was emphasized that the field of biological oceanography is comparatively neglected. It is true that biologists have studied marine plants and animals for a long time, but these studies have very largely been of organisms as component parts of the plant and animal kingdoms. The study of the living communities as an integral part of the sea has by comparison received relatively little attention. That is both an important and challenging field of scientific inquiry which should advance in close cooperation with the physical and chemical aspects of oceanography. (International Marine Science, October 1965.)



Aden

NEW STEEL PURSE-SEINER LEADS THE WAY TO MODERNIZATION:

The Department of Fisheries, Federation of South Arabia, has sponsored the construction of the prototype steel purse-seine vessel Federal Star II in an Aden shipyard. This is a breakthrough for the local fishing industry. It has been hailed by local fishermen as a major step in modernizing the Aden fleet which now consists mostly of small wooden vessels. The construction in Aden of another 4 steel fishing vessels similar to the Federal Star II is planned and 2 are already under construction. Building the vessels in Aden saves the high freight costs and other charges of importing fishing vessels.

Initially, the Federal Star II will be used for exploratory fishing in local waters (for tuna, mackerel, and kingfish), and in the training program operated by the Federal Fisheries Department. That training pro-

gram will provide qualified fishermen to operate the new modern vessels being built.



Fig. 1 - Federal Star II ready for launching.



Fig. 2 - With the Federal Star II on launching boards, the Aden shipyard has already started another steel fishing vessel. The hull in the foreground is being built in the inverted position. When the hull plates have been welded, the vessel will be turned upright and completed.

The Federal Star II can be used not only for purse-seining, but also for long-lining, trawling, and other methods of fishing. It is powered by a 60-horsepower diesel engine. The dimensions of the vessel are: length 40 feet, beam 14 feet, depth 6½ feet, and draft at the heel 4½ feet. The vessel measures 35

Aden (Contd.):

gross tons and is of all-steel welded construction with the wheelhouse and main propulsion unit forward. The after part of the vessel is a large working deck with a clear run aft over the wide transom stern for handling purse seine and other nets. The vessel is also equipped with a long-line hauler supplied by a Scottish firm. A power block is to be added to the vessel in the future.

Note: See Commercial Fisheries Review, Feb. 1964 p. 66.



Argentina

JOINT JAPANESE-ARGENTINE
TUNA ENTERPRISE:

The three 270-ton tuna fishing vessels fishing for the joint Japanese-Argentine tuna fishing and processing enterprise (established near Buenos Aires October 1959) in November 1965 averaged catches of about three tons of tuna per day per vessel. The vessels operate in grounds about five days from port and remain at sea for about 40-50 days. They are manned by 25-26 men, including 6-7 Argentines, but the turnover in the Argentine crew is said to be great, with many quitting after their first trip.

The rapid turnover in crew and the expense of hiring and training new fishermen, plus the procurement of fishing equipment from Japan, are reported to be the major management problems faced by that firm. As far as marketing problems are concerned, the Argentines are primarily beef-eating people but that company's canned tuna products are said to be gradually gaining local acceptance.

The joint firm, which is financed on a 50-50 basis (\$247,000 each), has a staff of 10 Japanese nationals working on land and 60 Japanese on the three tuna vessels. (Suis-ancho Nippo, November 25, 1965, and other sources.)



Australia

FISHERY EXPORT TRENDS,
JULY-SEPTEMBER 1965:

Australia's exports of fishery products in July-September 1965 were valued at

A£3,022,000 (US\$6,761,000), up 78 percent from the same three months in 1964. The increased value was due to higher prices paid for frozen spiny lobster tails in foreign markets. Exports of other fishery products during the period were lower than a year earlier.

Value of Australian Exports of Leading Fishery Items,
July-September 1964-65

Product	July-September			
	1965		1964	
	A£1,000	US\$1,000	A£1,000	US\$1,000
Spiny lobster:				
Tails	1,853	4,140	413	923
Whole	179	400	125	279
Total spiny lobster	2,032	4,540	538	1,202
Shrimp	435	972	466	1,041
Scallops	120	268	147	328
Total of products shown	2,587	5,780	1,151	2,571

Note: Australian £1.00 equals US\$2.234.

The export value of frozen spiny lobster tails in September 1965 was only half that of the previous month but the total value for the three months ending in September was 349 percent higher than in the same period of 1964.

The value of shrimp exports was only slightly lower than in the same three months of 1964. Japan continued as Australia's best market for shrimp, with a total of 171,000 pounds valued at £71,000 (\$158,600) shipped in September 1965. South Africa is becoming an increasingly important market for Australian shrimp.

France continued as the principal market for Australian scallops. The export value of that product during the period was down slightly from the same period in 1964.

Australia's exports of canned abalone are increasing, with a total of 239,000 pounds valued at £55,000 (\$122,900) shipped in July-September 1965. Australia's abalone exports near the end of 1965 were valued at £70,000 (156,400). A good part of those exports went to Malaysia and Singapore. (Australian Fisheries Newsletter, December 1965.).

Note: See Commercial Fisheries Review, March 1965 p. 67.



Brazil

CHANGES IN FISHERIES CODE PROPOSED:

A draft revision of the 1938 Brazilian Fisheries Code was published in the Diario Oficial, April 8, 1965. Interested persons were encouraged to submit suggestions concerning its provisions to the Superintendency for Development of Fisheries (SUDEPE).

The chief innovations proposed in the draft legislation and the "General Considerations" which precede the text were: (a) Permission for foreign fishing vessels and foreign fishermen to fish in Brazilian waters, subject to special authorization of the President of Brazil, in order to increase production and train Brazilian fishermen. (b) Studies to facilitate the importation of at least 100 motorized fishing vessels equipped with modern gear, as well as the chartering of foreign vessels for specified periods, since the Brazilian shipbuilding industry is not yet able to provide fishing vessels in the quantity needed. (c) Replacement of the paternalistic "Colonias" of fishermen by new organizations (the Director of SUDEPE favors cooperatives). (d) Conservation of fishery resources through delineation and control of inland and marine fishing areas, prohibition of pollution of those areas, regulation of seasonal fishing periods, vessels, equipment, etc., plus fines ranging from one-tenth to several multiples of the minimum salary for infractions of the Code.

Whereas the previous Fisheries Code restricted commercial fishery activities to Brazilian nationals and to Brazilian-owned vessels (an exception was made for the two Japanese companies which operate in Brazil, based on progressive nationalization of their operations), the draft code would permit foreign participation in Brazilian fishery firms in a ratio of up to 50 percent of the firm capital.

A condition for chartering foreign fishing vessels is that all exports are to be made by the Brazilian firms signing the charter agreements. Discussions were held between officials of SUDEPE and the Foreign Ministry of Brazil concerning proposed arrangements for chartering foreign vessels. (United States Embassy, Rio de Janeiro, April 30, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 64; June 1965 p. 46.

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NATIONAL COMMISSION FOR OCEANOGRAPHY ESTABLISHED:

Brazil has established a National Commission for Oceanography which will include representatives from the Brazilian Ministry of the Navy, Ministry of Agriculture, University of Sao Paulo, and University of Recife. (International Marine Science, October 1965.)



Bulgaria

TRAWLERS TO BE BUILT FOR DOMESTIC AND SOVIET FISHERIES:

Beginning in 1966, a shipyard at Burgas on Bulgaria's Black Sea coast will specialize in the construction of fishing vessels. During Bulgaria's new 5-Year Plan (1966-1970), 220 fishing trawlers are to be produced; of those 120 are to be exported to the Soviet Union which will operate them in the North Sea, the Barents Sea, and the Baltic Sea. Plans call for this new series of trawlers to each have a 300-horsepower engine; a displacement tonnage of 311 tons, and a length of about 30 meters (98 feet). Each trawler is to be able to operate continuously for 19 days without refueling. Every vessel is to have a refrigerated hold with a volume of 100 cubic meters (3,531 cubic feet) maintained at a constant temperature of -4° C. (+24.8° F.). All processing is to be fully mechanized. (Zemedelesko Zname, November 26, 1965.)

It is believed that the additions to the Soviet fleet from Bulgaria will serve mainly to replace obsolete Soviet trawlers built in the early post-World War II era in East Germany. They will not be used to further expand Soviet Baltic and North Sea operations.



Canada

FEDERAL GOVERNMENT TO ASSIST FISHERMEN FOR CATCH FAILURE:

Details of a Canadian Federal Government program to provide immediate assistance to fishermen who experienced a serious catch failure during the past season were announced December 3, 1965, by Canada's Fisheries Minister. The action implements an announcement on September 27, 1965, by the Prime Minister that the Government has "already taken steps to work out plans to assist the

Canada (Contd.):

fishermen in communities where, by the end of the season, the inshore fishery has been a failure."

The special assistance will be based on records of fishing income supplied by the Unemployment Insurance Commission, but actual payment will be made by the federal Department of Fisheries from money voted by Parliament for that purpose. To be eligible for assistance, a fisherman must have at least five weeks with fishing stamps in his book that were earned in 1965. This shows that he depends on fishing for a substantial part of his income.

A fisherman with no dependents who has five weeks with fishing stamps earned in 1965 but does not have an unemployment insurance entitlement of more than C\$150 in the 1965/66 benefit period will be eligible. Also eligible will be a fisherman with dependents who has five weeks with fishing stamps earned in 1965 but does not have an unemployment insurance entitlement for more than \$200 in the same period.

The amount of special assistance paid by Canada's Department of Fisheries will depend upon the fisherman's initial entitlement to seasonal benefit in the coming winter. If he had dependents he will receive the difference between \$200 and his earned unemployment insurance entitlement to benefit. If he has no dependents he will receive the difference between \$150 and his earned unemployment insurance entitlement to benefit.

The purpose of the program is to supplement the winter income of those fishermen who suffered catch failures in 1965. The supplement of \$200 or \$150 will be made up of the initial unemployment insurance entitlement plus the special assistance which will be available from the Department of Fisheries.

Fishermen who have not made application for Unemployment Insurance benefit this winter (1965/66) because they do not have minimum contributions required for Unemployment Insurance should make such application at a local office of the Commission in the usual way if they have a minimum of five weeks with fishing stamps earned in 1965. Fishermen will not be eligible for the special assistance from the Department of Fisheries

unless they have made an application for Unemployment Insurance benefit prior to March 26, 1966.

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FEDERAL DEPARTMENT OF FISHERIES SETS UP NEW CONSERVATION AND PROTECTION SERVICE:

A new Director of the new Conservation and Protection Service of Canada's Federal Department of Fisheries was appointed in December 1965. The new service was created from the former Conservation and Development Service, along with the new Resource Development Service. The Conservation and Protection Service will be responsible for the administration and operation of programs designed to protect and maintain stocks of fish through regulation of fishing and to carry out and expand those activities which were originally the responsibility of the Protection Branch of the former service. (Canadian Department of Fisheries, Ottawa, December 23, 1965.)

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GOVERNMENT SPONSORS NEW COMMUNITY FISH PROCESSING CENTERS IN NEWFOUNDLAND:

Plans to spend about C\$700,000 in Newfoundland to provide additional collection depots for fresh and frozen fish and community processing centers for salt fish were announced jointly December 23, 1965, by the Canadian Federal Fisheries Minister and the Newfoundland Minister of Fisheries. This is a continuation of an assistance program begun in 1965. In 1966, the emphasis will be on building collection centers for the frozen fish trade. The program of new construction is part of the arrangements entered into by the Governments of Canada and Newfoundland to accelerate fisheries development activity. The Federal Government will meet the cost of the buildings, including supporting marine works, and the Province will undertake responsibility for making building sites available and assuring normal maintenance and operation of the facilities. (Canadian Department of Fisheries, Ottawa, December 23, 1965.)

Note: See Commercial Fisheries Review, May 1965 p. 60.

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ATLANTIC OFFSHORE FISHING VESSEL CONFERENCE:

Hydrodynamic tests were conducted during late 1965 at the Canadian National Research

Canada (Contd.):

Council's laboratories in Ottawa on three hull models of a Canadian-designed stern trawler for deep-sea Atlantic fishing. The tests will provide the necessary information for a final design of a trawler hull which will be suited to specific demands of a Canadian vessel entering the highly competitive offshore trawl fishery on the Northwest Atlantic. The hulls were designed by naval architects to meet requirements called for by the Industrial Development Service of the Canadian Federal Department of Fisheries.

the economic and other problems involved in their operations, and development of the fisheries generally. (Canadian Department of Fisheries, Ottawa, December 6, 1965.)

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BRITISH COLUMBIA CANNED SALMON PACK, 1960-1965:

The 1965 pack of canned salmon in British Columbia of 912,796 cases was the smallest since 1960. The 1965 pack was down 27 per cent from 1964 due mainly to a light pack of

British Columbia Canned Salmon Pack, 1960-1965						
Species	1965	1/ 1964	1/ 1963	1/ 1962	1/ 1961	1/ 1960
			(Standard Cases--48 1-Lb. Cans)			
Sockeye	245,794	343,359	158,375	297,717	398,236	226,912
Spring (king)	18,886	9,127	10,000	7,174	7,927	5,935
Steelhead	841	1,262	771	815	979	530
Blueback	21,188	36,259	11,384	12,097	12,527	23,345
Coho (silver)	273,219	168,473	146,099	175,638	234,047	69,237
Pink	287,662	464,107	757,452	1,188,661	661,458	219,658
Chum	65,206	232,721	119,190	134,483	95,400	87,884
Total	912,796	1,255,308	1,203,271	1,816,585	1,410,574	633,501
1/ Revised.						
Source: Canadian Department of Fisheries.						

Sea-keeping qualities are not the only demands to be made on the eventual prototype of the vessel which is envisaged. Deck layout and machinery will provide for the most efficient fish and gear handling, and special attention will be given to safety factors and living and working conditions for the crew.

Canadian shipbuilders, naval architects, and the fishing industry had an opportunity to learn more about this vessel at the Canadian Atlantic Offshore Fishing Vessel Conference held in Montreal February 7-9, 1966. The final model was to be the subject of three papers, one considering it from a naval architect's viewpoint, another on its performance hydrodynamically, and the third from the viewpoint of fishing operations. More than 30 other papers were presented at the conference on many phases of the Northwest Atlantic fisheries.

The Conference was sponsored by Canada's Federal-Provincial Atlantic Fisheries Committee, which is made up of Deputy Ministers of Fisheries of the Federal Government and the governments of the five Atlantic coast provinces. Fisheries specialists from Canada, the United States, and Europe attended. Discussed were construction, design and equipment of deep-sea fishing vessels,

pink and chum salmon. Disappointing spawning runs of those species caused early closures on the fishing grounds and reduced supplies available to canneries.

Note: See Commercial Fisheries Review, Feb. 1965 p. 52.

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AMENDMENT OF LICENSING SYSTEM FOR COMMERCIAL FISHERIES IN BRITISH COLUMBIA PLANNED:

The Canada Department of Fisheries has announced that major changes will be made in 1966 in the British Columbia commercial fisheries licensing system. These will include an increase in the price of personal commercial fishing licenses and a system of licenses for individual fishing vessels. Additional changes are also under consideration.

Final details of the new system have not been completed. In the interim, the following procedures will apply in British Columbia. All holders of valid 1965 commercial fishing licenses will be allowed to operate under those licenses and without further payment or validation until March 31, 1966. All new applicants, and this includes everyone not covered by a 1965 license, will be issued a commercial fishing license for the usual fee and this license will be good from date of issue until

Canada (Contd.):

March 31, 1966. (Canadian Department of Fisheries, Vancouver, December 1, 1965.)

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BRITISH COLUMBIA HERRING FISHERY LABOR DISPUTE SETTLED:

After having been tied up by a labor dispute since October 16, 1965, British Columbia herring fishermen reached an agreement with processors on December 1, 1965. Terms of the agreement call for the payment of C\$17.40 a short ton for herring landed during the 1965/66 season. (The fishermen had been getting \$14.48 a ton and had asked for \$20.48 a ton.) The agreement also called for the payment to a fishermen's health and welfare plan of 20 cents for each ton of herring landed (an increase of 10 cents a ton). However, the settlement did not provide for other fringe benefits--such as a pension plan and paid vacations--that the fishermen were seeking.

Good herring catches were reported when fishing was resumed in early December 1965.

* * * * *

ONTARIO'S FISHERY RESEARCH PROGRAM ON LAKE ERIE:

Several field stations for carrying out fisheries research in the Province of Ontario have been established by that Province's Research Branch of the Department of Lands and Forests. The station's are located in various parts of Ontario and serve the need for individual studies on the most important species of fish, as well as the need for understanding the fish population dynamics in the Province's larger bodies of water. The Lake Erie Fisheries Research Station is at Wheatley in western Lake Erie, but studies are conducted in all parts of the lake, either from that base or the field laboratory at Port Dover in eastern Lake Erie. Scientists at that station are studying the fish populations in Lake Erie in order to understand why major fluctuations and drastic changes have occurred. The information that will provide this understanding will also form the basis for subsequent management proposals designed to minimize population fluctuations, while providing the best possible utilization.

The research data sought by the staff of the Lake Erie Fisheries Research Station come from observations and samples obtain-

ed from the lake from several sources. Research programs utilizing special and standard fishing and sampling gear provide data to answer particular questions. Routine "index" fishing provides a standard measure of the numbers of various species present from year to year. Trips with fishermen and samples of their catch provide estimates of the current fish populations being utilized. This latter information, when related to the commercial catch statistics, provides the only real estimate of a species abundance now available.

Most of the data on Lake Erie is collected from the research vessel Keenosau, a 50-foot steel vessel built especially for this work. The vessel, with a crew of three, is capable of navigating and operating in all parts of Lake Erie, and in all but the most severe weather conditions. The vessel may leave for a day's operation before sunrise, fish with any of several different standard or special fishing gear, and return to harbor in the late afternoon. Information is collected on the numbers and amounts of various species present, as well as samples of individual fish for laboratory study, and information on the size and sex of the fish. They also record water transparency, water temperatures, and lake conditions. Occasionally they are required to carry out prolonged operations traveling to all parts of the lake including United States waters. Occasionally the vessel is required for operations that must be carried out continuously over a 24-hour or longer period.

For every hour spent in collecting and recording information, there is an equal or greater effort required for analyzing, interpreting, and reporting on the results. This requires adequate shore facilities including a cooler-freezer, a fish-examination laboratory, a microscopy and a chemistry laboratory, a fish-scale reading room for aging the fish, as well as equipment to store, handle, and process large quantities of data. A new laboratory and office is being provided for the Lake Erie Fisheries Research Station at Wheatley. The new laboratory will have all those facilities and others required for analyzing and reporting on the data and for storing and maintaining the research vessel and gear. (Ontario Department of Lands and Forests, Toronto, November 25, 1965.)

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Canada (Contd.):

INDUSTRIAL PRODUCTS PRODUCTION, USE, AND FOREIGN TRADE, AUGUST 1964-JULY 1965 WITH COMPARISONS:

Marine Oil: In the marketing year August 1964-July 1965, Canadian imports of marine oils were down, but domestic production was 38 percent greater than in the preceding 12 months. Exports showed little change. Most of the 1964/65 Canadian output was produced in the latter part of 1964, because herring oil output in the first 7 months of 1965 was only 346,000 pounds as compared to 10.2 million pounds in the first 7 months of 1964.

Table 1 - Canadian Production and Foreign Trade in Industrial Products, August 1964-July 1965 with Comparisons

Item	Production	Imports	Exports
	..... (1,000 Pounds)		
Marine Oils^{1/}:			
August 1964-July 1965	84,629	2/2,027	18,450
August 1963-July 1964	61,140	3,187	18,222
	..... (Short Tons)		
Fish Meal:			
August 1964-July 1965	82,356	3/3,907	55,828
August 1963-July 1964	80,459	2,182	61,530

1/Conversion factor: 9.25 pounds per imperial gallon.

2/Partly estimated.

3/Data available only for August 1964-May 1965.

Wholesale prices (f.o.b. Toronto) for British Columbia herring oil were 10.2 Canadian cents a pound in August 1964, 10.7 cents in September 1964, 13.1 cents in December 1964, 12.9 cents in March 1965, 12.2 cents in June 1965, and 11.5 cents in September 1965.

With fish oil prices at a high level, there were heavy substitutions of soybean oil for marine oil in margarine production. The use of marine oils in Canadian margarine fell from 44.0 million pounds in marketing year 1963/64 to 28.7 million pounds in 1964/65.

Table 2 - Canadian Exports of Fish Meal by Country of Destination, August 1964-July 1965 with Comparisons

Product and Country of Destination	Aug. 1964-July 1965		Aug. 1963-July 1964	
	Quantity	Value	Quantity	Value
	Short Tons	C\$1,000	Short Tons	C\$1,000
Herring and Pilchard Meal:				
United Kingdom	2,410	358	2,132	283
United States	38,998	6,054	48,404	6,884
Total herring and pilchard meal	41,408	6,412	50,536	7,167
Other Fish Meal:				
United Kingdom	11,064	1,515	8,088	1,008
United States	2,966	405	2,666	311
Other countries	394	54	235	32
Total other fish meal	14,424	1,974	10,989	1,351

Fish Meal: In the August-July period of 1964/65, Canadian production of fish meal was up slightly from the preceding 12-months period, but exports were down due to a decline in shipments of herring meal to the United States. (United States Embassy, Ottawa, October 15, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 62; Dec. 1964 p. 84; Aug. 1964 p. 56.



Colombia

JAPAN-COLOMBIA JOINT TUNA ENTERPRISE PROPOSED:

A Japanese fishing company, a subsidiary of another fishing company, together with a trading firm, hopes to establish a joint tuna fishing enterprise in Colombia. The Colombian Government is reported as looking favorably on the plan which was initially broached two years ago. Reportedly, the joint company will operate purse-seine vessels to fish for yellowfin tuna. (Suisan Keizai Shimbun, November 25, 1965.)

Note: The same firm is also involved in a joint trawling shrimp enterprise established October 1963 in the Malagasy Republic.



Denmark

EXPORTS OF FISHERY PRODUCTS AND BYPRODUCTS, JANUARY-SEPTEMBER 1965:

Exports to All Countries: Denmark's total exports of fishery products and byproducts to all countries in January-September 1965 to-

Table 1 - Danish Fishery Products Exports to all Countries, January-September 1965 with Comparisons

Products	1/ Jan.-Sept. 1965			Jan.-Sept. 1964		
	Quantity	Value		Quantity	Value	
		Metric Tons	1,000 US\$		Metric Tons	1,000 US\$
Fish:						
Fresh	132,897	276,296	40,063	139,967	250,856	36,374
Frozen	35,545	158,968	23,050	34,691	127,346	18,466
Salted	3,208	13,568	1,967	2,442	13,900	2,000
Smoked	514	7,591	1,101			
Canned:						
Fish	4,055	15,937	2,311	4,182	15,800	2,300
Shellfish	1,338	10,903	1,581	902	7,100	1,000
Semipreserved Products:						
Fish	1,358	9,432	1,368			
Shellfish	679	4,726	685	1,638	10,200	1,500
Other Products:						
Fish meal, solubles, ensilage, and trout food	72,558	77,844	11,287	55,690	52,030	7,544
Total	252,152	575,265	83,413	239,512	477,232	69,184
Fish oil ^{2/}	40,721	55,288	8,017	18,161	21,197	3,074

1/Preliminary data from the Ministry of Fisheries.

2/Fish oil data are shown separately as they are collected by another Ministry and often are delayed. Note: One Danish krone equals US\$0.145.

Denmark (Contd.):

taled 252,152 metric tons valued at 575 million kroner (US\$83.4 million). As compared with the same period in 1964 this was an increase of 5 percent in quantity and 21 percent in value. Exports of fresh fish were down 5 percent in quantity but were up 10 percent in value; exports of fresh whole herring and flatfish fillets were lower. Exports of frozen fishery products were up 2 percent in quantity and 25 percent in value. Better

Table 2 - Value of Danish Exports of Fishery Products by Groups and Major Countries, January-September 1965 with Comparisons

Destination	1/Jan.-Sept. 1965 | Jan.-Sept. 1964			
	Value			
	1,000 Kr.	US\$ 1,000	1,000 Kr.	US\$ 1,000
By Groups:				
Common Market (EEC) . . .	250,400	36,308	207,000	30,015
European Free Trade Assn. (EFTA - including Finland)	242,800	35,206	198,000	28,710
East Bloc countries	23,200	3,364	22,000	3,190
Other countries	58,900	8,541	50,000	7,250
Total	575,300	83,419	477,000	69,165
Major Importers by Country:				
West Germany	165,000	23,925	129,000	18,705
United Kingdom	106,000	15,370	97,000	14,065
Sweden	81,000	11,745	59,000	8,555
Italy	37,000	5,365	33,000	4,785
Switzerland	37,000	5,365	30,000	4,350
United States	30,000	4,350	19,000	2,755

1/ Preliminary data from the Ministry of Fisheries.

prices were received for exports of most frozen fish. Other major fishery products were up both in quantity and value except canned fish which showed little change. Exports of semipreserved fish and shellfish (canned or jarred) were up considerably. Danish caviar, made from lumpsucker roe, is the most important semipreserved product. A single Danish company is responsible for more than half of the world production of that product, exporting it to more than 60 countries.

Exports of fish meal during the first 9 months rose from 43,000 tons in 1964 to almost 53,000 tons in 1965 and the value was up from nearly 46 million kroner (\$6.7 million) to 67 million kroner (\$9.7 million). Danish fish meal production increased in 1965 and markets were good. Exports of fish oil were up 83 percent in quantity and 117 percent in value from the same period in 1964.

Exports to the United States: Exports of Danish fishery products to the United States in January-September 1965 rose 61 percent in quantity and 57 percent in value from the same period a year earlier. Exports of cod fillets, mostly in the form of frozen blocks, were up 90 percent in quantity and 140 percent in value. United States buyers of frozen fish blocks were reluctant to contract early in 1964 but the situation changed in 1965. Prices for cod fillets in 1965 averaged about 25 percent higher. Exports of pond trout to the United States continued high--up 69 percent in quantity and 29 percent in value from the same period a year earlier, but the average price of those exports was down about 24 percent. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 8, 1965.)

Note: See Commercial Fisheries Review, October 1965 p. 70; February 1965 p. 44.



Ecuador

JAPAN-ECUADOR TUNA ENTERPRISE PLANNED:

A Japanese firm plans to establish a joint tuna fisheries enterprise in Ecuador. The joint company, to be located at Guayaquil, Ecuador, is expected to commence operations with two tuna vessels. (Suisan Keizai Shim-bun, November 25, 1965.)

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Table 3 - Danish Exports of Fishery Products and Byproducts to the United States, January-September 1965 with Comparisons

Product	1/Jan.-Sept. 1965			Jan.-Sept. 1964		
	Qty.	Value		Qty.	Value	
		1,000 Kr.	US\$ 1,000		1,000 Kr.	US\$ 1,000
Fresh & frozen:						
Pond trout	587	3,461	502	346	2,685	389
Other trout & salmon	50	492	71	-	-	-
Trout eggs	1	89	13	1	75	11
Flatfish 2/	156	1,590	231	227	2,020	293
Fillets:						
Cod	4,096	16,226	2,352	2,154	6,729	976
Other	7	29	4	90	393	57
Norway lobster	112	3,039	441	160	3,105	450
Total	5,009	24,926	3,614	2,978	15,007	2,176
Cured products:						
Salted & smoked 3/	9	66	10	27	103	15
Canned products:						
Sprats & herring	440	2,258	327	434	2,133	309
Shrimp	92	1,021	148	93	950	138
Mussels	97	472	69	46	277	40
Other	27	199	29	25	157	23
Total	656	3,950	573	598	3,517	510
Semipreserved products	24	282	41	12	153	22
Fish solubles	600	642	93	300	284	41
Grand Total	6,298	29,866	4,331	3,915	19,064	2,764

1/ Preliminary data from the Ministry of Fisheries.

2/ Mostly turbot, brill, plaice, and sole.

3/ Mostly cod, salmon, trout, and eels.

Ecuador (Contd.):

FISHING FLEET STATUS, 1964:

The development of the domestic tuna and groundfish industry is being emphasized by the Ecuadorean Government's National Economic Planning and Coordination Board. This coincides with a growing interest on the part of United States investors in the Ecuadorean fishing industry. The following report gives an indication of the country's fisheries base:

Tuna: The Ecuadorean tuna fleet increased by 7 units in 1964 to a total of 51 vessels. Most of those have a limited range and concentrate their activity around the port of Manta and the Santa Elena peninsula when tuna are running. The average characteristics of those vessels are: length overall 14 meters (46 feet), 46 gross tons, 144 horsepower, and estimated value US\$14,200.

As of summer 1965, 4 tuna purse-seine vessels were operating, of which 3 (with capacities of 50 to 80 tons each) belonged to a large cannery operated at Manta by United States interests. Another United States group was reported to be setting up a plant at Manta to freeze tuna for export to Puerto Rico.

Shrimp: Ecuador's annual shrimp landings have leveled off at about 5,000 metric tons (live-weight basis) in recent years. Most of those landings are frozen for export mainly to the United States. The average characteristics of the 160 vessels in the Ecuadorean shrimp fleet were reported in December 1963 as follows: length overall 15 meters (49 feet), 163 horsepower, and estimated value \$19,600.

Improved refrigeration and net-handling equipment are being installed on some of the shrimp vessels, but a large part of the shrimp fleet still lacks the gear and refrigeration equipment which would permit fishing off the coast in waters of 30 fathoms or more.

Groundfish: The 9 vessels in the Ecuadorean groundfish fleet at the end of 1964 averaged 17 gross tons, 84 horsepower, and had an estimated average value of \$10,800.

Miscellaneous: In 1962, it was estimated that Ecuador had over 14,000 small independent fishermen in 209 fishing communities working mostly from small nonpower-driven craft. They used various kinds of nets (drag,

surf, trammel, stake, and casting), as well as harpoons and fishing lines. (United States Consulate, Guayaquil, December 10, 1965, and other sources.)

Note: See *Commercial Fisheries Review*, Dec. 1965 p. 54; and Aug. 1965 p. 71.



France

TUNA EX-VESSEL PRICES AND IMPORT QUOTAS SET FOR WEST AFRICAN 1965/1966 SEASON:

Duty-free quotas for canned tuna entering France from its former West African colonies are established each year. Ex-vessel prices are also set for tuna landed at canneries in West Africa by French-operated vessels.

The ex-vessel prices and quotas for the 1965/66 West African season (which opened November 1, 1965, for yellowfin) were reported in *Le Moniteur Africain* as follows:

Prices: 1.65 francs a kilo (US\$330 a metric ton) for yellowfin tuna weighing at least 3 kilos (6.6 pounds) and big-eyed tuna weighing from 3 to 35 kilos (6.6 to 77 pounds).

1.10 francs a kilo (\$220 a metric ton) for yellowfin and big-eyed tuna weighing less than 3 kilos, and skipjack weighing at least 2.5 kilos (5.5 pounds).

The proportion of skipjack in relation to the total tuna landed is fixed at 15 percent. Fishermen will receive, in addition, a bonus of 0.10 francs a kilo (\$20 a metric ton) for skipjack delivered to the factories.

The French tuna fleet scheduled to operate off West Africa in 1965/66 is about the same as in the previous season.

Quotas: France has reduced the quantity of canned yellowfin tuna that may be imported duty-free from West Africa. (The quotas are set on the basis of raw tuna canned.) For canned yellowfin, the 1965/66 French duty-free quotas (raw tuna weight) are 10,000 tons for Senegal, 1,600 tons for the Ivory Coast, and 400 tons for the group consisting of Mauritania, Congo-Brazzaville, and Malagasy Republic. Compared with the previous season, that is a cut of 1,000 tons for Senegal and 600 tons for the Ivory Coast.

France (Contd.):

In Senegal, where 7 tuna canneries were in operation until 2 years ago, there are now only 3 plants in operation. The Government of Senegal, however, is planning an ambitious expansion of its tuna industry, largely with the aid of the U.S.S.R., which in 1964 granted a \$6.7 million loan for fisheries development. Senegal's 4-Year Plan calls for reducing its canned tuna exports to France to 5,000 tons (fish weight) in 1969, and increasing its exports to countries outside of the Franc Zone to 25,000 tons.

In the case of the Ivory Coast, the reduction in the French quota to 1,600 tons will further hamper the operations of the one remaining tuna cannery in Abidjan. This plant, however, had in December commenced sardine canning in a modest way, which should tend to stabilize their operation. The Ivory Coast is also developing plans for a greatly expanded tuna operation, including the construction of a 3,000-ton storage-capacity freezer plant, the establishment of a fleet of Ivorian tuna clippers, the construction of a modern tuna cannery designed to produce canned tuna competitive on the world market, a can-making factory, and a byproducts operation. (Regional Fisheries Attache, United States Embassy, Abidjan, December 7, 1965.)



East Germany

"ATLANTIK"-CLASS FREEZER TRAWLERS BEING BUILT FOR U.S.S.R.:

The 270-foot stern-trawler Atlantik is the latest model factory freezer trawler being built for the Soviet Union by East Germany. An East German shipyard in Stralsund is reported to have contracted to deliver 103 trawlers of the Atlantik-class to the U.S.S.R. by 1970. Previously, East Germany built a number of 262-foot Tropic-class trawlers for the Soviets. Like the Tropiks, the Atlantiks will have air-conditioning and other equipment for sailing in tropical climates. The Atlantik-class vessels, however, are somewhat larger with greater processing, freezing, and storage capacity. The shipyard building the Atlantik series described the vessel as follows:

The Atlantik is a 2-decker vessel. The rear sector of the main deck has been de-

signed as the fishing deck. Below the fishing deck are processing rooms. The engineroom and refrigeration machinery are midships at a lower level. Three storage holds (2 forward and 1 aft) have a combined capacity of 1,075 cubic meters (37,963 cubic feet). The vessel also has a fish meal storage room with a capacity of 163 cubic meters (5,756 cubic feet) and fish oil bunkers with a capacity of 11 cubic meters (388 cubic feet).

The trawl catch of the vessel is passed from the fishing deck through 4 hydraulically-operated hatches into 4 prefreezing bunkers at the rear of the processing rooms.

The prefreezing bunkers have the daily capacity to chill 48 tons of fresh fish to 2° C. (35.6° F.). Each of the bunkers is provided with a bucket elevator to convey chilled fish to workrooms. From the bucket elevator, fish are dropped through a chute upon a sorting belt where they are sorted for size before freezing in blocks or individually on 2 belt-type freezers with a combined freezing capacity of 45 tons in 22 hours. Frozen fish are stored at a temperature of -25° C. (-13° F.).

The fish meal and oil reduction unit uses a wet process which can handle 35 tons of raw fish or fish offal in 24 hours.

The Atlantik is designed to sail independently for 60 days with a crew of 80. Fresh water is supplied by a desalinization plant. The vessel is equipped with 2-engine diesel propulsion, variable-pitch propeller, automatic control of fishing gear from the bridge, echo-sounding equipment (horizontal and vertical), and radar. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, November 18, 1965, and other sources.)

Note: See Commercial Fisheries Review, June 1965 p. 81, and Nov. 1964 Supplement p. 9.



Greenland

SALMON FISHERY TRENDS, JANUARY-NOVEMBER 1965:

Inshore: The rise of the inshore Greenland salmon catch from about 55 metric tons in 1960 to 1,400 tons in 1964 has stirred considerable interest. However, in January-November 1965, the Greenland salmon catch a-

Greenland (Contd.):

mounted to only about 640 tons as compared with 1,300 tons in the same period of 1964. Fishing in December was expected to add little to the 1965 inshore catch. The drop in the 1965 catch to about half that in 1964 was due in large part to a diversion of fishing effort to the cod fishery.

Offshore: A Faroese vessel and a Norwegian vessel fished offshore from Greenland with gill nets in 1965. The catch of the Faroese vessel was estimated to be 40 tons by the end of November 1965, at which time the vessel was still fishing. The Norwegian vessel was reported to have returned home with a catch of 12 tons. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 9, 1965, and other sources.)

Note: See Commercial Fisheries Review, Jan. 1966 p. 75, and Nov. 1965 p. 58.



Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, OCTOBER 31, 1965:

As of October 31, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 2,624 metric tons, a decline of 1,505 tons from the stocks on hand September 30, 1965. (United States Embassy, Reykjavik, November 29, 1965.)

Icelandic Export Stocks 1/of Principal Fishery Products, October 31, 1965			
Item	Qty. Metric Tons	Value	
		Million Kr.	US\$ 1,000
Groundfish, frozen: for export to:			
U. S.	2,624	69.8	1,621.0
other countries ...	4,862	92.4	2,145.8
Stockfish.....	1,800	55.8	1,295.9
Herring, frozen.....	1,710	9.7	225.3
Industrial products:			
fish meal:			
herring	27,954	234.8	5,452.9
other fish	2,089	15.4	357.6
herring oil	38,674	305.5	7,094.7

1/Includes only stocks intended for export.
Note: Icelandic kronur 43.06 equal US\$1.00.

United States imports of frozen groundfish fillets from Iceland in the year 1964 totaled 17,812 metric tons of groundfish blocks and slabs, 4,669 metric tons of cod fillets, 2,791

metric tons of haddock fillets, and 548 metric tons of ocean perch fillets.

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HERRING LANDINGS AND EXPORT TRENDS, LATE 1965:

By mid-November 1965 Iceland's herring catch surpassed the record 1964 herring catch of 553,036 metric tons, according to the Fisheries Association of Iceland. Export prices for herring products in 1965 were generally higher than in 1964. In 1964, herring products accounted for 35 percent of the value of all Icelandic exports.



Fig. 1 - Icelandic fishing vessel brailling herring.

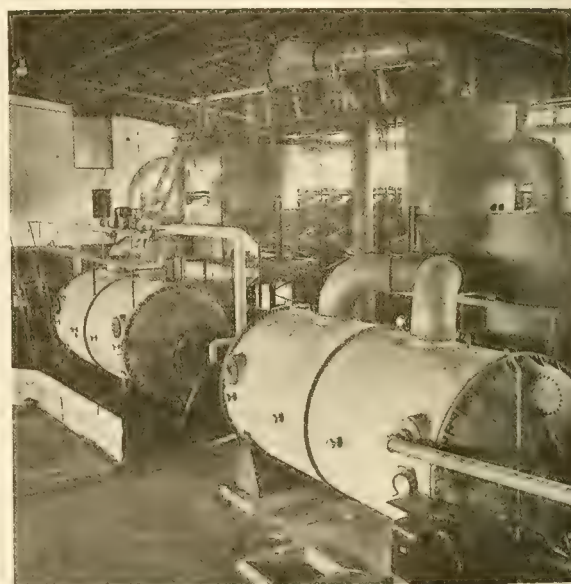


Fig. 2 - Type of evaporators used to dehydrate whole fish under vacuum in an Icelandic herring meal plant.

In January-October 1965, the total Icelandic herring catch was 546,552 metric tons as

Iceland (Contd.):

compared to 543,089 metric tons during the same 1964 period. During the first 10 months of 1965, 473,381 metric tons of that herring catch went into reduction (meal and oil), an 11.4-percent increase over the same 1964 period; and 57,096 tons went for salting, a 7.1-percent increase over January-October 1964. But herring for freezing in January-October 1965 was only one-quarter of that in the 1964 period, a drop from 65,029 tons to 16,075 tons.

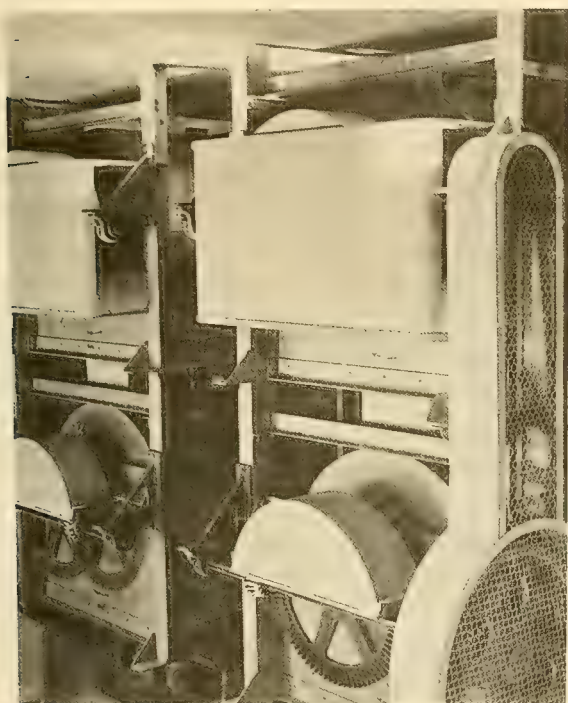


Fig. 3 - Cookers in an Icelandic herring fish meal plant.

A comparison of prices for Icelandic herring products available for export at the end of September 1965 with average 1964 export prices shows herring meal prices up 17 percent, herring oil up 4 percent, salted herring down 6 percent, and frozen herring down 3 percent. (United States Embassy, Reykjavik, November 17, 1965.)



Japan

FROZEN TUNA EXPORTS TO U. S. AND PUERTO RICO, OCTOBER 1965:

Japan's exports of frozen tuna to the United States and Puerto Rico in October 1965 were up 21 percent in quantity and 19 percent in value as compared with those in the previous month.

Exports to the United States were 9 percent more than in September and the value was up 17 percent.

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, October 1965 with Comparisons

Species	October		September	
	Quantity	Value	Quantity	Value
	Short Tons	US\$ 1,000	Short Tons	US\$ 1,000
Albacore:				
United States	2,593	906	2,387	798
Puerto Rico	2,734	893	1,688	501
Total	5,327	1,799	4,075	1,299
Yellowfin:				
United States	1,586	566	1,460	462
Puerto Rico	751	217	712	400
Total	2,337	783	2,172	862
Big-eyed:				
United States	9	1	2	1
Puerto Rico	34	8	100	19
Total	43	9	102	20
Total United States	4,188	1,473	3,849	1,261
Total Puerto Rico	3,519	1,118	2,500	920
Grand total	7,707	2,591	6,349	2,181

Source: Japan's Bureau of Customs.

Exports to Puerto Rico in October increased 41 percent from the previous month and the value was up 22 percent. Most of the increase in October shipments to Puerto Rico was in albacore tuna--up 62 percent in quantity and 78 percent in value. There was also some increase in yellowfin shipments to Puerto Rico but exports of big-eyed tuna were down to about one-third the quantity shipped in September. (Fisheries Attache, United States Embassy, Tokyo, December 10, 1965.)

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EXPORT VALIDATIONS OF FRESH AND FROZEN TUNA AND TUNA LIONS, APRIL-OCTOBER 1965:

Japan's export validations of frozen tuna and cooked frozen tuna loins to the United States and Canada in October 1965 were up 12.7 percent from the same month in 1964. Albacore and yellowfin tuna accounted for

Japan (Contd.):

82.2 percent of that month's export approvals to those countries. Included in the September 1965 shipments were 1,233 short tons to Japanese landing bases including American Samoa.

Japan's Export Validations of Fresh and Frozen Tuna and Tuna Loins by Country of Destination, April-October, 1965						
Item	To U. S. & Canada		To Other Countries		Total	
	Oct.	Apr.-Oct.	Oct.	Apr.-Oct.	Oct.	Apr.-Oct.
	..(Short Tons)..		..... (Metric Tons)			
Albacore, round	5,832	43,434	728	5,859	6,023	45,265
Yellowfin:						
Round	356	2,187	160	257	483	2,241
Gilled & gutted:						
20/100 lbs.	1,204	18,282	-	2,392	1,093	18,977
100 lbs. up	8	1,716	-	-	7	1,557
Prsd. with tail	464	4,547	334	14,660	755	18,786
Fillets	-	3	6	10	6	12
Other	435	2,426	-	-	2,200	2,200
Total	2,467	28,161	500	17,319	4,544	43,773
Big-eyed:						
Dressed,	53	316	188	5,599	236	5,886
Other	415	1,019	145	569	1,026	1,494
Total	468	1,335	333	6,168	1,262	7,380
Skipjack	651	5,126	696	1,213	1,287	5,863
Bluefin:						
Dressed	-	-	15	2,600	15	2,600
Fillets	-	-	-	947	-	947
Other	15	15	-	-	14	14
Total	15	15	15	3,547	29	3,561
Loins:						
Albacore	589	2,132	-	9	535	1,944
Yellowfin	72	1,127	-	24	65	1,046
Total	661	3,259	-	33	600	2,990
Grand total 1965	10,094	82,330	2,272	34,139	13,745	108,832
Grand total 1964	8,950	82,989	3,875	31,733	11,994	107,020

For the 7 months April-October 1965, Japan's frozen tuna export validations for the United States and Canada (included 7,032 tons to Japanese landing bases) were down about 1 percent from the same 7 months of 1964. (Fisheries Attache, United States Embassy, Tokyo, December 3, 1965.)

TUNA MARKET TRENDS, DECEMBER 1965:

An unusual tuna market situation developed in Japan in December 1965. Normally at that time of the year, domestic tuna demand is very strong due to the oncoming January holiday season. However, due to the expected arrival in Japan of 60-70 tuna vessels from the western Pacific, Indian Ocean, and Atlantic Ocean tuna grounds in December, the ex-vessel price of tuna for the domestic trade dropped about 20 percent from December 1964 prices. The decline in prices is also attributed in part to a general business downturn in Japan, the slackening demand for fish for the sashimi (raw, thinly sliced fish) trade, and to poor sales of fish sausages.

On the other hand, the export frozen tuna market was very firm and prices showed an

upward trend since November 1965. The ex-vessel price of frozen round albacore rose from 140 yen a kilogram (US\$353 a short ton) in late November to about 145 yen a kilogram (\$365 a short ton) in December. Buy offers from the United States for albacore ranged upwards to \$425 a short ton c.i.f., for albacore loin \$825-835 a ton c.i.f., and for Atlantic albacore \$360-370 per ton f.o.b. Las Palmas. (Suisan Tsushin, December 6, 1965 and other sources.)

FROZEN TUNA EXPORT PRICE TRENDS, NOVEMBER 1965:

Japanese frozen tuna export prices continued to trend upwards in November 1965, according to several Japanese trade periodicals. Spain was offering for Japanese-caught Atlantic albacore US\$460-470 a metric ton, c.i.f., or more than \$60-70 a ton above September prices. Albacore transhipped to Puerto Rico were quoted at \$405 a short ton, c.i.f., but even at that price U. S. buyers were said to be experiencing difficulty in procuring supplies. U. S. west coast packers were offering \$395 a short ton c.i.f. for frozen albacore shipped directly from Japan, but Japanese traders were said to be holding firm for higher prices. The ex-vessel price of albacore in Japan was said to be holding steady at 140 yen per kilogram (\$353 a short ton).

Prices of yellowfin tuna for export to Italy advanced to a record high of \$455-460 per metric ton c.i.f. Big-eyed tuna for export to that country were quoted at \$375-380 a metric ton c.i.f. (Katsuo-Maguro Tsushin, November 26; Suisan Tsushin, November 24, 1965.)

GOVERNMENT AND TUNA INDUSTRY HOLD FIFTH MEETING:

The Japanese Government and tuna industry leaders, who have been holding a series of joint meetings, to seek ways and means of aiding the depressed tuna fishery, on November 29, 1965, held their fifth and possibly final discussion meeting. Purpose was to (1) assess the present state of the tuna resources and (2) to determine the direction toward which government policy must be shaped to assist industry. With regard to resource assessment, the Government and industry leaders were divided in their views, the Government maintaining that, on the basis of data compiled by the Nankai Regional Fisheries (tuna) Re-

Japan (Contd.):

search Laboratory, the resources have not declined to the level affecting reproduction, whereas industry claimed reproduction has been affected. Concerning the direction in which Government policies should be developed to assist the tuna fishery, Government and industry views were likewise split, with the Government asserting the present fishing effort should be maintained, while the industry argued that effort should be reduced through fleet reduction.

There was no significant division of opinions concerning other problems affecting the fishery, such as management, marketing, and labor problems. A final meeting to draft recommendations was scheduled for January 1966, but in view of the lack of agreement on key issues the preparation of a unified recommendation for submission to the Government was expected to be difficult.

At the November 29 meeting, the proposal made at an earlier discussion meeting by the Japan National Federation of Tuna Fishermen's Cooperatives (NIKKATSUREN)--i.e., to establish a corporation to handle problems related to fleet reduction and to provide financial assistance to vessel owners in difficulty--was not discussed. The Government's expression of views at that meeting that the present level of fishing effort should be maintained is interpreted as diminishing the likelihood that NIKKATSUREN's proposal will be adopted. (Suisancho Nippo, November 30, 1965.)

Note: See Commercial Fisheries Review, January 1966 p. 79; December 1965 p. 62; October 1965 p. 80; September 1965 p. 66; July 1965 p. 71.

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CANNED TUNA PACK, 1964:

Japanese canned tuna production in 1964 totaled 2,769,798 cases (48 1-pound cans), consisting of 1,134,388 cases of tuna in brine, 875,947 cases of tuna in oil, and 759,463 cases of other tuna products. In the tuna in brine pack, white meat accounted for 914,051 cases (907,664 cases solid pack and 6,387 cases flake pack) while lightmeat accounted for 220,337 cases (219,216 cases solid pack and 1,121 cases flake pack); the tuna in oil pack consisted of white meat 224,666 cases (190,636 cases solid pack and 34,030 cases flake pack) and light meat 651,281 cases (612,653 cases solid pack and 38,628 cases

flake pack). The 759,463 cases of "other tuna products" included 210,783 cases of flavored solid tuna, 353,306 cases of flavored flake tuna, 37,633 cases of jelly tuna, and 157,741 cases of other types of pack. The canned tuna in brine, both white meat and light meat, was packed principally in 7-oz. cans (48 to the case), with substantial amounts in 13-oz. cans (24 to the case), and 4-lb. cans (6 to the case). The canned tuna in oil was packed principally in 7-oz. cans. (48 to the case). (Kanzume Jiho, Vol. 44, No. 9, September 1965.)

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FIRM TO MARKET CHUNK-STYLE CANNED TUNA IN OIL IN JAPAN:

Beginning in February 1966, a Japanese firm plans to market canned tuna in oil (chunk style) packed in 7-oz. cans for the domestic market. The firm has designed an attractive label for the pack aimed at creating the image of a high-quality canned food. The pack is expected to be retailed for about 110 yen (US\$0.355) a can. (Suisan Keizai Shimbun, November 18, 1965.)

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TUNA PACKERS AND EXPORTERS FAIL TO NEGOTIATE NEW EXPORT AGREEMENT FOR CANNED TUNA IN BRINE:

Japanese tuna packers and exporters again towards the end of 1965 (as in 1964) failed to resolve their differences in renegotiating a new "Exporters Agreement" for canned tuna in brine. Prior to the termination of the old agreement, which expired November 30, 1965, the Ministry of International Trade and Industry (MITI) was reported as having proposed extending that existing agreement temporarily for three months (Note: The exporters wanted a four months extension) to February 28, with the export quota for that period set at 800,000 cases. The packers rejected the proposal since, like the exporters' proposal, it called for allocating the export quota on the basis of a 70-percent merit (actual performance) quota and 30-percent adjustment quota. The packers were reported seeking a change in the allocation system based on a merit quota of 40 percent and adjustment quota of 60 percent.

Following the failure of the exporters and packers to resolve their differences, MITI then announced that sales contracts concluded after December 1 to export canned tuna in

Japan (Contd.):

brine to the United States would not be validated for export. On December 2 the packers and exporters met again for the second time but failed to negotiate a new agreement. At that meeting, in response to a joint letter calling for a settlement of their differences by December 15 (signed by the chief of the Agricultural and Aquatic Products Section, MITI, and the chief of the Marine Products Section, Fisheries Agency, Ministry of Agriculture and Forestry), the packers and exporters drafted a joint reply to the effect that they opposed MITI's action but would defer the responsibility of drafting an interim agreement (to extend for one month) to the two government agencies. (Suisan Tsushin, December 3 & 4; Katsuo-Maguro Tsushin, November 26, 1965, and other sources.)

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TUNA FEDERATION LAUNCHES PROMOTION ON CANNED ALBACORE TUNA IN OIL:

The Japan Federation of Tuna Fishermen's Cooperative Associations (NIKKATSUREN), which has been developing plans to promote domestic demand of canned albacore tuna in oil in an effort to stabilize albacore export prices, launched its first promotion in Tokyo on November 6, 1965. Under joint sponsorship with the Japan Canned Foods Association, NIKKATSUREN held a "tuna party" at the Nissei Theater in Tokyo, inviting 144 guests, including home economists from women's colleges, women's magazine editors, food editors for newspapers, and wives of the Minister of Agriculture and Forestry, and Diet representatives concerned with fisheries. A movie was shown and during the intermission over 10 varieties of foods prepared from canned albacore in oil were served to the guests. Through similar food sampling parties, NIKKATSUREN hopes to better acquaint consumers with canned albacore in oil which it plans to market beginning in March 1966 under its own label bearing the JAS (Japan Agricultural Standard) mark. NIKKATSUREN hopes to pack in the first year the equivalent of 150,000 cases (48 no. $\frac{1}{2}$ 7-oz. cans) of solid, which is 3 to 4 times the quantity now being produced in Japan for domestic consumption.

The November 6 "tuna party" is part of a gigantic three-year promotional program NIKKATSUREN plans to launch at a total cost of about 100 million yen (US\$278,000). Funds

for the promotion will be raised mainly by assessing Federation members. (Katsuo-Maguro Tsushin, November 10; Suisan Keizai Shimbun, November 2, 1965.)

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SKIPJACK TUNA POLE-AND-LINE FISHING IN EASTERN ATLANTIC REPORTED EXCELLENT:

The six Japanese pole-and-line vessels (one 350-ton and five 240-ton) in the eastern Atlantic in November 1965 had excellent skipjack tuna fishing. Some vessels made as many as three trips a month. The six vessels will most certainly be able to put in an average of 18 trips a year. A minimum of 12 trips per vessel per year is calculated to be necessary for the vessels to show a profit.

The skipjack, which are being landed at Tema, Ghana, and at Freetown, Sierra Leone, sold ex-vessel for US\$140 a short ton for large fish and \$110 a ton for small skipjack. At Tema large quantities of the small skipjack were being marketed locally. (Suisan Tsushin, November 26, 1965.)

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LARGE NUMBER OF ATLANTIC TUNA VESSELS RETURN:

Japanese tuna vessels engaged in the Atlantic fishery had returned to Japan in large numbers by early November 1965. They shifted their operations to the Pacific and Indian Oceans. The Japanese Atlantic fleet, which at the height of the fishery numbered about 140 vessels, was down to about 80 vessels, with indications that it may decline to 50 vessels by spring 1966. High prices paid for tuna landed in Japan influenced Atlantic tuna operators to shift their operations to Japan.

The rise in tuna prices in Japan is attributed to the steadily increasing demand for frozen tuna as sashimi (sliced fish served raw), the demand for which peaks in January for the holiday trade, and to the supply shortage arising from the declining catch. According to a survey made by one Japanese fishing company, yellowfin tuna landed in Japan in November 1965 sold at an average of 180 yen a kilogram (US\$454 a short ton), up 20 percent from spring, and albacore (primarily canned or exported in the round to the United States) 138-140 yen a kilogram (US\$348-353 a short ton) up 22-23 percent. (Suisan Kei-

Japan (Contd.):

zai Shimbun, November 11, 1965, and other sources.)

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TUNA BAIT PRODUCTION TRENDS:

As a result of the poor saury season in 1964, Japanese tuna long-line fishermen were faced with a critical shortage of bait saury in 1965 and had to pay as much as 12 yen (US\$0.033) a fish. In anticipation of another poor saury season in 1965 (in progress the latter part of the year), the large tuna vessel operators systematically began to purchase medium and large saury for bait as soon as the season commenced in the fall. Total Japanese production of bait saury, as of October 30, was 29,200 metric tons, with an additional 8,000 tons expected to be processed by November 18.

The annual demand of bait saury is estimated at 45,000 metric tons but since 1964 many fishermen were reported to have switched to other bait fish, such as sardines, squid, and mackerel because of the high price of bait saury. In November 1965, a box containing 120-130 large bait saury was selling at the landing ports for 650-700 yen (US\$1.80-1.94), with 140-150 count fish selling for about 570 yen (\$1.58). Cost to the fishermen is estimated to be 8-9 yen (\$0.022-0.025) a fish, which is much less than what they paid a year earlier. Some saury were sold to South Korean and Formosan tuna fishermen for \$3.20 a box for 140-150 count fish, delivery American Samoa. (Suisan Tsushin, November 26, 1965.)

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PURSE SEINER TO TEST FISH FOR TUNA IN CAROLINE ISLANDS WATERS:

The 212-ton Japanese purse seiner Taikei Maru (equipped with two power blocks) was scheduled to depart Japan on November 25, 1965, to explore the tuna fishing grounds off the Caroline Islands. The vessel will make a total of five trips up to April 15, 1966, and operate in two areas: (1) the area bounded by the equator and latitude 10° N. between longitudes 130° E. and 140° E.; and (2) the Coral Sea grounds east and southeast of New Guinea between longitudes 140° E. and 160° E. Each trip is expected to take 26 days (16 days running, 7 days fishing, and 3 days unloading and taking on supplies). From April

25 to May 30 the vessel will make two trips to the tuna grounds bounded by: (1) latitudes 10° N. and 20° N. between longitudes 140° E. and 150° E. and (2) latitudes 20° N. and 30° N. between longitudes 125° E. and 130° E., but excluding the waters to the west of Nansei (Ryukyu Islands). (Suisan Keizai Shimbun, Nov. 19, 1965.)

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NEW TUNA TROLLING GEAR DEVELOPED:

A new trolling gear has been developed in Japan to help the tuna fishing industry overcome the problem of declining catch. Devised by Dr. Hamuro of the Fishing Boat Research Division of the Japanese Fisheries Agency, the new gear employs a submersible device housing a telemeter and a "fish head trapper," which is attached to the troll line near the artificial lure. In operation, first the tuna school is located by means of a fish-finder and the depth of the school determined. The telemeter in the submersible unit transmits signals to the vessel, which are plotted on the fish-finder chart. Using this information, the depth of the new gear is adjusted to the depth of the fish school by means of a hydraulic or electrically-powered winch. When the fish strikes the lure, the tension on the line releases from the submersible device the "fish head trapper" (consisting of six wire claws), which slides down the leader and "grabs" (slides over) the head of the fish, thereby preventing its escape. As the "fish head trapper" is released from the submersible device, this action simultaneously reverses the angle of the wing-shaped flaps of the unit, propelling the device upwards to the surface. The troll line is then reeled in by means of a winch and the fish retrieved.

The trolling gear consists of: (1) main line, to which are attached the submersible echo-sounder and "head trapper," leader and lure; (2) power equipment, including a hydraulic winch; (3) information-relaying devices, such as fish-finder and telemeter; and (4) other mechanical devices, such as a line-tension meter. About eight lines can be fished at one time by a 300-ton tuna vessel.

The advantages of the new gear are said to be the selectivity of depth ranges beyond the presently fished 200 meters (656 feet), wider selectivity of fishing grounds, improved freshness of fish since they can be landed immediately upon capture, elimination of shark damages, reduction in gear loss, substantial

Japan (Contd.):

savings in operating costs through the use of artificial lures (which eliminates the need for fish bait, such as saury and squid); and reduction in manpower.

Initial gear tests conducted off Kurihama (south of Tokyo Bay) and in the South Pacific off the Samoan Islands were not completely satisfactory (partly due to the scarcity of fish and to the lateness of the season), but refinement is expected to contribute greatly to the exploitation of mid-water tuna and other species of fish. (Suisan Keizai Shimbun, November 26, 1965.)

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TUNA FISHING COMPANY
TRIES TO CUT LABOR COSTS:

To combat rising costs and declining catch rates in the tuna fishing industry, a major Japanese company is trying to (1) reduce the size of crews on its tuna vessels, and (2) reinstate the "share" system of paying crews according to results. That cost-cutting program was described in Nihon Kogyo, November 18, 1965, as follows:

A major Japanese company is studying the restoration of the "onaka sei" system of paying tuna fishing crews according to the value of their landed catch. The company recently applied that system to 20 of its tuna vessels based at Tokyo with good results.

Furthermore, the company is trying to reduce the size of crews on its tuna vessels. The company recently sent the Hatsuhi Maru (170 tons) to the South Seas with its crew reduced from 28 to 15 men. That reduction together with the "onaka sei" system of payment resulted in savings of 3 million yen (US\$8,333).

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CRAB MEAT EXPORTS, OCTOBER 1965:

Japanese exports of canned crab meat in October 1965 amounted to 40,499 cases (48 $\frac{1}{2}$ -lb. cans) as compared with 66,308 cases during the previous month and 60,150 cases in October 1964. Of the total canned crab meat exports in October 1965, 12,404 cases were shipped to the United States, 8,775 cases to the United Kingdom, 825 cases to Canada, and 18,495 cases to other unspecified countries.

In October 1965, king crab meat exports amounted to 29,149 cases or 72 percent of total canned crab meat exported. Of the total king crab exported in that month, 10,390 cases went to the United States, 6,525 cases to the United Kingdom, and 12,234 cases to other countries.

The October 1965 Japanese canned crab meat exports also included: Kegani crab--6,953 cases, of which 1,614 cases went to the United States; Zuwai crab--4,297 cases, of which only 400 cases went to the United States; 100 cases of Hanasaki crab were shipped to unspecified countries. (Fisheries Attache, United States Embassy, Tokyo, November 30, 1965.)

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EXPORTS OF CANNED KING CRAB
TO U. S. DECLINE:

Japan has contracted to sell to foreign countries a total of 210,000 cases (48 $\frac{1}{2}$ -lb. cans) of king crab from her 1965 pack. Sales to the United States, which in previous years consumed over half of Japan's king crab exports, have dropped and the United States as of November 1965 ranked second as the principal buyer of Japanese crab meat. France led in the importation of Japanese king crab with 65,000 cases, followed by the United States with 58,000 cases, and Great Britain with 56,000 cases. (Suisan Tsushin, November 13, 1965.)

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CANNED SHRIMP EXPORTS,
OCTOBER 1965:

Japan's exports of canned shrimp (24 $\frac{1}{2}$ -lb. cans) during October 1965 were more than double those of the previous month but were down 62 percent from the October 1964 exports.

Compared to the previous month, the biggest increase was in shipments to the United

Japan's Exports of Canned Shrimp by Country of Destination,
October 1965 and Comparisons

Country of Destination	1965		1964	
	Oct.	Sept.	Oct.	Sept.
. . . . (Cases of 24 $\frac{1}{2}$ -Lb. Cans)				
United States	6,900	3,000	17,700	16,275
United Kingdom . . .	18,387	3,000	44,009	37,100
Canada	2,000	5,900	8,500	6,836
Other	4,730	2,900	13,800	5,358
Total	32,017	14,800	84,009	65,569

Japan (Contd.):

Kingdom; exports to the United States were up also; but shipments to Canada were down 66 percent. (Fisheries Attache, United States Embassy, Tokyo, November 30, 1965.)

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FROZEN SWORDFISH EXPORT VALIDATIONS TO THE U.S. AND CANADA, APRIL-OCTOBER 1965:

Japanese export validations of frozen broadbill swordfish (mostly fillets and chunks) to the United States and Canada in October 1965 totaled 466 short tons valued at US\$382,966. This compared with approvals of 591 tons valued at \$479,857 in the previous month and 369 tons valued at \$236,084 in October 1964.

For the 7 months April-October 1965, Japan's export validations of frozen swordfish to the same countries totaled 2,751 tons valued at \$2.1 million. Fillets of that species accounted for 64 percent of the total, with the remainder consisting of chunks and swordfish processed in other forms. For the same 7 months in 1964, the frozen swordfish export approvals totaled 2,092 tons valued at \$1.3 million. (Fisheries Attache, United States Embassy, Tokyo, December 3, 1965.)

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EXPORTS OF FROZEN RAINBOW TROUT, OCTOBER 1965:

Japan's exports of frozen rainbow trout in October 1965 were down slightly as compared with the previous month--dropped 6 percent in quantity but increased 4 percent in value. The United States continued as the principal buyer of Japanese frozen rainbow

Japan's Exports of Frozen Rainbow Trout by Country of Destination, October 1965				
Destination by Country	October		September	
	Qty.	Value	Qty.	Value
	Short Tons	US\$	Short Tons	US\$
United States	157	125,869	131	97,869
United Kingdom . . .	19	13,058	41	25,500
Belgium	4	3,336	11	7,903
Canada	18	15,531	26	19,447
Netherlands	15	12,997	12	9,583
West Germany	1	792	-	-
Australia	-	-	2	1,689
Sweden	1	469	6	3,828
Other	1	462	-	-
Total	216	172,514	229	165,819

Source: Japan's Bureau of Customs.

trout, accounting for 73 percent both in quantity and value of the total October 1965 exports.

October shipments to the United Kingdom were down to about half those of the previous month. (Fisheries Attache, United States Embassy, Tokyo, December 10, 1965.)

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EXPORTS OF MARINE PRODUCTS, JULY 1965:

Japan's exports of marine products in July 1965 included considerably more canned fish

Japan's Exports of Marine Products, July 1965		
Product	Quantity	Value
	Metric Tons	US\$ 1,000
Fresh & frozen:		
Tuna, skipjack	519	67
Tuna, other	18,044	5,742
Marlin	530	386
Sea bream	2,165	322
Mackerel	395	61
Saury	184	61
Salmon	16	25
Other fish	1,905	633
Total fresh & frozen	23,758	7,297
Whale meat	1,985	458
Frog legs	111	178
Cured:		
Cod	6	6
Boiled and dried	36	17
Shark fins	77	133
Other	6	2
Total cured	125	158
Shellfish, etc.:		
Scallops	3	28
Oysters	9	8
Shrimp	107	236
Squid	679	181
Octopus (fresh)	87	39
Other	161	72
Total shellfish, etc.	1,046	564
Canned:		
Salmon	7,610	14,081
Tuna, skipjack	458	347
Tuna, other	3,198	2,950
Mackerel	2,435	844
Saury	416	203
Sardine	127	53
Horse mackerel	1,428	489
Other fish	1,641	1,133
Crabs	602	1,753
Shrimp	272	653
Squid	174	67
Other shellfish	724	683
Total canned	19,085	23,256
Other products:		
Seaweed:		
Kombu	45	31
Laver 1/	121	8
Agar agar	86	311
Whale oil (baleen)	60	333

1/In 1,000 sheets.

Japan (Contd.):

than was exported in the previous month, and there was some increase in shipments of fresh and frozen fishery products. Salmon accounted for much of the increase in the canned fishery products group, followed by larger exports in July of canned mackerel, crab, and shrimp.

The July 1965 exports of fresh and frozen fishery products were up 18 percent in quantity and 11 percent in value from the previous month. As compared with the previous month, exports of fresh and frozen tuna in July were up 11 percent in quantity and 12 percent in value. (Fisheries Attache, United States Embassy, Tokyo, November 18, 1965.)

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FIRM TO IMPORT SHRIMP FROM THAILAND:

A Japanese whaling firm plans to import about 500 metric tons of frozen shrimp a year from a Thailand processor. Japanese wholesale prices for imported shrimp are said to be between ¥500,000 and ¥700,000 (US\$1,389 to \$1,944) a metric ton or about 63 to 88 cents a pound. The Japanese firm may also buy shrimp in Thailand for re-export to other countries. The Japanese firm plans to give technical and managerial assistance to its Thailand associate. (*Nihon Kogyo*, December 7, 1965.)

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FISHERY LANDINGS IN SELECTED AREAS, JUNE 1965:

Japan's landings of fish and shellfish at 248 fishing districts and 5 major cities during June 1965 totaled 337,800 metric tons, a decrease of about 8 percent below May 1965 landings, but an increase of 15.6 percent above the landings in June 1964. Compared with the previous month, the most significant decreases in the June 1965 landings were in jack mackerel and scad, mackerel, and Alaska pollock.

Landings of the major species in June 1965 were as follows (June 1964 data in parentheses): tuna 50,700 tons (61,200 tons); jack mackerel-scad 49,100 tons (39,600 tons); mackerel 50,200 tons (37,400 tons); common squid 15,600 tons (5,500 tons); flounder 15,000 tons (8,200 tons); and Alaska pollock 23,600

tons (36,000 tons). (Fisheries Attache, United States Embassy, Tokyo, December 14, 1965.)

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LANDINGS AND UTILIZATION OF FISHERY AND OTHER MARINE PRODUCTS, APRIL 1965:

Japan's landings of fishery and other marine products at 248 major landing points in April 1965 totaled 267,593 metric tons, down about 10 percent from the previous month's landings. Fresh fish accounted for 90 percent of the total landings, with the remainder mostly frozen fish. As compared with the previous month, landings were down for mackerel and mackerel-like species, Alaska pollock, and anchovies, but increased for tuna and several flatfish species.



Fig. 1 - A large catch of yellowtail unloaded on the beach of a Japanese fishing village.



Fig. 2 - In Tokyo Bay, transferring bait from live box to fishing vessel in background.

Included in the April 1965 landings were (in metric tons): fresh and frozen tuna (in-

Japan (Contd.):

cluding skipjack) 32,216, mackerel 40,099, horse mackerel 31,250, Alaska pollock 37,902, flounder and other flatfish 10,889, and swordfish 5,418.

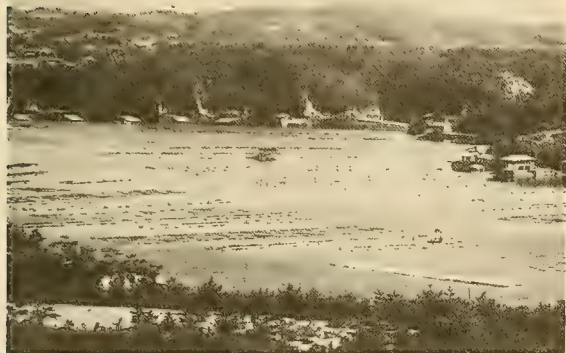


Fig. 3 - Pearl oyster rafts in Kaskiojima Ago Bay, Japan.

Of the total April 1965 landings, 134,421 tons were used fresh and 16,699 tons were frozen. About 70,000 tons were processed as edible fishery products and byproducts--8,542 tons were for canning, and about 2,000 tons manufactured as oil, feed, and fertilizer products, with the remainder processed in other forms. (Fisheries Attache, United States Embassy, Tokyo, November 12, 1965.)

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JAPANESE VIEWS ON FISHERIES AGREEMENT WITH SOUTH KOREA:

Under the Fisheries Agreement concluded in June 1965 between the Governments of Japan and the Republic of Korea (ROK), Japan agreed to provide substantial economic aid to South Korean fisheries. The agreement also called for Japan to recognize Korean coastal fishery limits of 12 nautical miles and provided a conservation area in the Korean Strait in which fishing will be jointly restricted. Final ratification was also expected to expand Korean fishery exports to Japan.

The Fisheries Agreement is part of an effort to normalize relations between the two countries. In December 1965, the Governments of the two countries were negotiating ways to carry out the agreement. At the same time, a private agreement concerning safe fishing conditions was being negotiated

by the Greater Japan Fisheries Association and the ROK Central Council of Fisheries Unions.

Japanese financial assistance to Korea will include a \$90-million fisheries aid fund set up under the normalization agreement, plus reparations owed to the ROK, and private loans. Korea plans to use the funds for large-scale fishing fleet expansion. Guidelines for aiding Korean fisheries while at the same time protecting Japanese interests were set forth by the Japanese Fisheries Agency, November 9, 1965, as follows:

(1) With regard to the improvement of Korean fishing ports and public distribution facilities, Japan will comply with the ROK requests as far as possible. Japan will also contribute toward a general buildup of ROK fisheries and also toward increasing the income of ROK fishermen.

(2) Japan will offer necessary commodities and services for the modernization of Korean coastal fisheries, coastal fishing vessel equipment, and even for the promotion of fish farming. However, the culture of pearls will not be regarded as an object of cooperation.

(3) The number of Japanese trawlers and purse-seine vessels which can be exported to Korea will partly depend on the size of Korean fleets in the common restricted areas, and also on the state of fishery resources in fishing grounds outside the restricted areas.

(4) The number of bonito and tuna fishing vessels which will be exported will be fixed so as not to affect Japanese fishing for bonito and tuna.

(5) Neither vessels for fishing for salmon, salmon-trout, and crab in the northern seas, nor whaling vessels will be exported, partly because measures for preserving those resources are being taken under international fisheries treaties.

Reaction of the Japanese fishing industry to the agreement has been mixed. Some of the large Japanese fishing companies are interested in joint ventures with Korean groups. On the other hand, Japanese fishermen are concerned about restrictions on their fishing grounds and the effect of increased fishery shipments from Korea.

Japan is reported to be planning to reduce the size of its fishing fleet off the eastern coast of the Korean Peninsula from about 3,000 to 1,700 vessels. Most of those involved are small coastal vessels which can't be easily converted to other fisheries.

The recognition of a 12-mile Korean fisheries limit is also causing concern. It is felt that it may serve as a precedent that will encourage other countries to expand their limits, thereby further limiting Japanese fishermen.

Japan (Contd.):

Japanese concern over expanded Korean fishery shipments grows out of the desire to protect domestic markets. Marine products exports to Japan valued at US\$63 million in 1967 is the goal of the ROK. That would be a threefold increase over 1964. The ROK side is asking Japan for liberalization of import restrictions on cheaper fish such as saury, mackerel, and sardines.

It appears that the Japanese-Korean Fisheries Agreement may result in considerable readjustment for both countries. (Sankei, November 10, 1965, Yomiuri, November 18, 1965, and other sources.

Japanese-ROK Private Fisheries Agreement: On December 17, 1965, a Japan-ROK Private Fisheries Agreement was signed in Seoul. The parties to the Agreement are the Greater Japan Fisheries Association and the ROK Central Council of Fisheries Unions. The Agreement was reported to follow the general outline agreed upon during preliminary negotiations in Tokyo, December 1, 1965. Following are the major points outlined in the preliminary negotiations:

1. Aims of the Agreement shall be clearly stated as (1) realization of safe fishing operations by vessels of the two nations and (2) mediation for compensation for damage caused by accidents. Supplementary documents shall have stipulations concerning maintenance of order on fishing grounds.
2. The following eight items shall be the basic items of the Agreement: sea areas to which the Agreement is applicable, marks, matters to be observed in conducting fishing operations, matters concerning sailing for shelter, matters concerning anchorage and drifting, salvage, and the term of validity of the Agreement.
3. Stipulations for marks shall be established according to day and night and types of fisheries, except for those stipulated in the Government-To-Government Agreement and the International Marine Clash Prevention Rules. As for matters to be observed in conducting fishing operations, operating intervals shall be fixed according to types of fisheries.
4. Regarding the handling of accidents, an "Accident Disposition Committee" (tentative name), to be composed of private organizations of the two countries, shall be established. The Committee shall have consultations every 2 or 3 months.
5. The term of validity of the Agreement shall follow that of the Government-To-Government Agreement.

The concluding negotiations in Seoul were concerned mainly with the handling of accidents and damage compensation. It was agreed that accidents should be settled mutual-

ly, if possible, through negotiations between the vessels involved. Private organizations of the two countries will assume responsibility for adjusting compensation when agreement can't be reached by the fishing vessels concerned.

The Japanese and Korean parties to the Private Fisheries Agreement plan to meet twice a year to discuss relations between the two countries. (Nihon Keizai, December 2 and 18, 1965.)

Note: See Commercial Fisheries Review, Dec. 1965 pp. 64 and 72; and Dec. 1964 p. 104.

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PROPOSED TECHNICAL COOPERATION AGREEMENT WITH SOVIETS:

On October 12, 1965, the Japanese Fisheries Agency met with Japanese trade groups to explain a proposal for technical cooperation between Japanese and Soviet fisheries. The Soviet Fisheries Minister had recommended such cooperation when the Japanese Minister of Agriculture and Forestry visited Japan in May 1965. It was hoped that the proposal could be given formal recognition on the occasion of the Soviet Fisheries Minister's visit to Japan which is anticipated in the spring of 1966.

The proposal aims at scientific and technical cooperation (excluding salmon for which cooperative agreements have already been concluded) to improve Japanese and Soviet fisheries. Following are the main provisions of the Japanese Fisheries Agency draft of the 5-year "Japan-Soviet Fisheries Scientific, Technical Cooperation Plan" as published in Nihon Keizai, October 12, 1965:

Exchange of Information and Data: Would include (1) fishery statistics, (2) periodical publications, and (3) books.

Joint Surveys of Fish Resources: Would include (1) joint surveys of mackerel pike in which Japanese officials would board a Soviet vessel, (2) joint surveys of bottom fish (after the second year); and (3) joint surveys of tuna (after the fourth year).

Inspection and Study Activities, and Interchange of Specialists: Would include (1) inspection for surveying fishing implements and fishing methods (the first year); (2) inspection of study and development programs and sur-

Japan (Contd.):

vey vessels (the second year); (3) inspection of fishery hatcheries and breeding methods (the third year); and (4) inspection of the use of processed marine products (the fourth year).

Adjustments of Cooperation Plan: An adjustment conference would be held once a year in Tokyo and Moscow alternately.

* * * * *

MAJOR FIRMS PLAN EXPANSION OF MINCED FISH OPERATION:

The major Japanese fishing firms operating factoryship fleets in the Bering Sea in November 1965 were planning to greatly expand their minced fish operations. A large fishing company dispatched the 11,581-ton factoryship Tenyo Maru (accompanied by 6 trawlers in the 270- to 370-ton class) to the Bering Sea around December 1, 1965. The fleet is scheduled to return to Japan in late March 1966. The fleet's production target is 4,500 metric tons of minced fish meat, 1,000 tons of frozen fish, 2,000 tons fish meal and 300 tons of fish oil. That firm is also contemplating using its 11,193-ton factoryship Soyo Maru for processing minced fish in 1966.

Another major Japanese firm is converting its 10,357-ton fish meal factoryship Gyokuei Maru to increase the factoryship's minced fish production capacity threefold, to 30 metric tons a day. However, Gyokuei Maru will continue to serve primarily as a fish-meal factoryship.

Two other large firms also have under study plans to engage in minced fish meat production in 1966. One firm is expected to engage in minced fish production on an experimental basis in 1966.

The interest of the major Japanese fishing firms to engage in or expand their minced fish operation (Note: Alaska pollock is the primary species used in minced fish production) is attributed to the increased demand in Japan for minced fish (used extensively as a fish sausage and cake ingredient), large resource of Alaska pollock available in the Bering Sea, excellent yield, and high prices paid for minced fish meat. It is reported that 100 metric tons of Alaska pollock yield as much as 25 tons of minced fish as compared to 16 tons of fish meal (Note: Alaska pollock are

also used extensively by Japan in the production of fish meal). Good quality minced fish meat fetches as much as 130,000 yen (US\$361) a metric ton as compared to 73,000 yen (US\$203) a ton for fish meal. Thus, it would be more profitable to process minced fish despite the somewhat high cost of processing that product. (Suisan Keizai Shimbun, November 15, 1965.)

* * * * *

INDUSTRIAL PRODUCTS PRODUCTION, USE, AND FOREIGN TRADE, 1964-1965 AND FORECAST 1966:

Fish Meal: Japan is an importer of fish meal despite sizable domestic production. Forecasts call for 1966 (calendar year) Japanese fish meal production to equal the estimated 1965 output of 285,000 metric tons. Imports in 1966 are expected to continue at the 1965 level of 100,000 tons. Japanese imports of fish meal in January-July 1965 totaled 79,200 tons.

Table 1 - Japanese Fish Meal Supply Situation and Foreign Trade, Calendar Years 1964-1965 and Forecast 1966			
Item	1/1966	2/1965	1964
	.. (1,000 Metric Tons) ..		
Production	285.0	285.0	271.4
Imports:			
Year	100.0	100.0	102.3
January-July	-	79.2	68.5
Exports:			
Year	10.0	10.0	6.2
January-July	-	6.0	3.2
1/Forecast.			
2/Estimated.			

Marine Oil: In the past, the Japanese marine oil industry has satisfied domestic needs and yielded large quantities of whale oil and sperm oil for export. But forecasts indicate declining production will reduce export stocks in 1966.

The margarine and shortening industry is the main domestic user of edible marine oils. It will take 21,300 tons of whale and 26,200 tons of fish oil in fiscal year 1965 (April 1965-March 1966), according to estimates by the Japanese Ministry of Agriculture and Forestry. Other domestic food uses should account for an additional 1,300 tons of marine oil in fiscal 1965. The estimates indicate that for domestic nonfood uses in fiscal 1965 a total of 19,600 tons of sperm oil and 6,200 tons of fish oil will be consumed.

Whale and Sperm Oil: Japanese estimated 1965 (calendar year) whale oil produc-

Japan (Contd.):

Table 2 - Japanese Marine Oil Supply Situation and Foreign Trade, Calendar Years 1964-1965 and Forecast 1966

Item	1/1966	2/1965	1964
	. . . . (1,000 Metric Tons) . . .		
Edible Marine Oil:			
Fish-Liver Oil:			
Production	8.0	8.0	8.9
Exports:			
Year	1.0	1.0	1.8
January-July	-	.5	1.0
Fish Oil:			
Production	19.0	19.0	18.1
Opening stocks	7.0	7.2	9.9
Whale Oil:			
Production	90.0	100.0	115.3
Opening stocks	4.0	3.7	5.9
Exports:			
Year	60.0	72.0	80.7
January-July	-	71.6	80.6
Inedible Marine Oil:			
Sperm Oil:			
Production	30.0	37.0	46.5
Opening stocks	2.0	2.2	7.3
Exports:			
Year	4.0	10.0	25.0
January-July	-	8.4	24.6
1/Forecast.			
2/Estimated.			

tion of 100,000 metric tons was down 13 percent from 1964. Sperm whale oil output in 1965 of 37,000 tons was down 20 percent. Further declines are forecast in 1966 because of Antarctic conservation measures.

Exports declined with the supply in 1965. Forecasts call for baleen whale oil exports to drop from 100,000 tons in 1965 to 90,000 tons in 1966. Sperm whale oil exports are expected to drop to a very low level in 1966 as the Japanese Antarctic fleet concentrates mainly on catching baleen whales.

Fish-Body Oil: Japanese production of fish oil in 1964 dropped 17 percent from the 24,000 metric tons produced in 1963. The estimated output in 1965 amounted to 19,000 tons, and 1966 production is expected to continue at the same level. Japanese foreign trade in fish-body oils is limited.

Fish-Liver Oil: Japanese production of fish-liver oil is estimated at 8,000 metric tons in 1965 and forecast at the same level in 1966. Exports of 1,000 metric tons are estimated for 1965 and forecast for 1966. (United States Embassy, Tokyo, October 8, 1965.)

Note: See *Commercial Fisheries Review*, Aug. 1965 p. 87; and July 1965 p. 77.

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FISHERIES AGENCY TO ASK TIGHTER REGULATION OF CULTURED PEARL INDUSTRY:

In late 1965, the Japanese Fisheries Agency was preparing a "White Paper" on problems in Japan's valuable cultured pearl industry. That industry yielded export products valued at 20 billion yen (US\$55.6 million) in 1964. Now, however, overcrowding is creating problems in the industry. The Fisheries Agency "White Paper" will be mainly concerned with ways to (1) avoid overcrowding of culture beds and (2) improve quality control.

At the pearl beds of Ago Bay in Mie Prefecture (where about 40 percent of Japanese pearls are turned out) and in the Prefectures of Ehime and Oita, the abuses of congested culture have already become quite clear. Recently, only about 3.75 kilograms (8.3 pounds) of pearls were taken out of 10,000 mother-of-pearl at those beds, as against an average of about 5.6 kilograms (12.3 pounds) until several years ago.



Pearl oyster rafts in Kaskiojima Bay, Japan.

The major recommendations to be announced in the Japanese Fisheries Agency "White Paper" on pearls were reported in *Nihon Keizai*, October 19, 1965, as follows:

Problems and Recommendations: At present, local public entities in Japan are permitted to exercise jurisdiction over pearl fisheries as they like. For the overall coordination of administration over pearl fisheries, the central Government should intervene in this field of administration. It is necessary to establish a "maximum-limit formula" for the licensing of pearl culture, through such methods as (1) specifying the standard size for pearl beds, (2) establishing suitable conditions to be required for the starting of new enterprises, and (3) setting a proper scale for each

Japan (Contd.):

pearl fishery ground corresponding with productivity.

Many Japanese pearl fishery enterprises are short of funds and, consequently, hasten to raise products from small beds. It is necessary to give financial aid to those enterprises. An agency to stabilize the prices of pearls by such measures as coordination and stockpiling must be established in order to prevent a decline in prices due to overproduction in small beds. The present Japanese Pearl Fisheries Law must be revised mainly for the purpose of restricting the issuance of licenses to new pearl fishery enterprises.

* * * * *

COMPOSITION OF DISTANT WATER TUNA FLEET:

A total of 843 Japanese vessels were engaged in the distant-water long-line tuna fisheries as of January 1, 1965. Of that number, 669 vessels (194,797 gross tons) were long-liners and 50 were factory-type mother-ships (55,055 gross tons) carrying 124 portable-type fishing craft.

Most of the long-liners were vessels ranging from 180 to 500 gross tons; 5 were of 500 to 700 gross tons; and 2 were over 700 gross tons. The factory-type motherships ranged from 500 to 3,000 gross tons; 3 were of 3,000 gross tons and over. The 124 portable vessels totaled 2,242 gross tons. (Fisheries Attache, United States Embassy, Tokyo, November 17, 1965.)

* * * * *

TUNA FEDERATION CHARTERS OIL TANKER TO REFUEL VESSELS AT SEA:

The Japan National Federation of Tuna Fishermen's Cooperative Associations (NIK-KATSUREN) again chartered the 1,983-ton tanker Tofuku Maru to conduct high-seas refueling in the eastern Pacific Ocean. NIK-KATSUREN expected to assign a doctor to the tanker to provide medical services to the fishermen at sea.

The Tofuku Maru, which was scheduled to depart Japan November 11, 1965, expected to call at Maui Island, Hawaii, before proceeding to Balboa, Panama, to pick up additional fuel and supplies. On her first leg across the Pacific, the vessel was expected to refuel and provision a total of 30-40 fishing

vessels. (Katsuo-Maguro Tsushin, November 5 & 10, 1965.)

* * * * *

APPLICATIONS FOR DISTANT-WATER TRAWL FISHERY:

In July 1965, the Japanese Government approved the licensing of 22 trawlers over 500 gross tons to engage in the distant-water trawl fishery, which includes all ocean areas except the waters north of 10° N. latitude in the Pacific Ocean, north of 40° N. latitude in the Atlantic Ocean, the Mediterranean Sea, Gulf of Aden, and the Red Sea. Closing date for receiving license applications was set as October 5, 1965. As of October 12, the Central Office of the Fisheries Agency had received a total of 95 applications, but the figure was not final since the Agency had not yet heard from all the regions. However, the Agency was reported as not expecting to receive more than 100 applications. (Suisan Tsushin, November 13, 1965, and other sources.)

(Note: The first licensing of trawlers for the distant-water trawl fishery was announced in July 1963. At that time, the Japanese Government announced that it would approve the operation of a total of 48 "standard" (50- to 300-ton) trawlers, not including those vessels already operating in the fishery. The Government also established a conversion system, which allowed for the construction of larger trawlers on the basis of one large trawler for x number of "standard" vessels, and in November of that year approved the licensing of 18 trawlers, ranging in size from 300-3,500 tons, mainly for operation in the Atlantic Ocean. Available data as of the end of November 1965 indicated that there were about 45 large trawlers, mostly in the 1,500- to 3,000-ton class, operating in the Atlantic Ocean off West Africa and South Africa. The 22 trawlers over 500 tons to be newly licensed are also expected to operate mainly in the Atlantic Ocean.)

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FIRM PURCHASES CARGO VESSEL FOR KING CRAB FACTORYSHIP:

A Japanese firm has purchased the 7,292-ton cargo vessel Kyowa Maru as a replacement for the 5,385-ton king crab factoryship Tokei Maru which was lost at sea off the Philippine Islands in October 1965. The Kyowa Maru, purchased at a price of about

Japan (Contd.):

230 million yen (US\$639,000), will undergo extensive modifications and is expected to be ready for service by March 1966. (Suisan Tsushin, December 2, 1965.)

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WHALING OPERATIONS AFFECTED BY LABOR DISPUTE:

Some of the Japanese whaling fleets in the Antarctic and the Bering Sea were hit by a 12-hour work stoppage on December 12, 1965, the opening day of the Antarctic season. The fleets of only one whaling company were affected. Involved were the Nisshin Maru and Nisshin Maru No. 3 fleets in the Antarctic (2 of the 5 Japanese fleets in the Antarctic) and the Tenyo Maru fleet in the Bering Sea.

The work stoppage arose out of a labor dispute in which processing workers in the whaling fleets were asking for a basic pay increase of ¥4,800 (US\$13.33) and a 30-percent increase over the previous season in special allowances. The whaling company had offered a basic increase of ¥3,000 (\$8.33) and a 7-percent increase in special allowances.

A Union representative said additional work stoppages might be called if negotiations failed to produce a settlement. The seamen involved are members of the All-Japan Seamen's Union which in early December 1965 was involved in a nationwide work stoppage. But seamen on the high seas, including the whaling fleets, had previously been exempted from the walk-out. (Japan Times, December 14, 1965.)



Republic of Korea

FIVE TUNA VESSELS ORDERED FROM WEST GERMANY:

South Korean interests have commissioned a West German shipyard in Leer to build five tuna long-line vessels, according to a report in the German periodical Allgemeine Fischwirtschafts-Zeitung, November 27, 1965. The first vessel, the No. 1 Kum Yong, is scheduled for completion early in 1966. The other four vessels are also expected to be delivered in 1966.

The vessels will have an overall length of about 115 feet. Length between perpendiculars will be about 100 feet, molded breadth about 20 feet, and draft about 8 feet. The vessels will measure under 200 gross registered tons and have a fish-hold for storing about 130 metric tons of fish. Each vessel will be equipped with freezing equipment with a capacity of 4 metric tons per hour. Each vessel will be powered by a diesel engine of 460 horsepower giving a cruising speed of 10 knots. Reportedly, the vessels will be capable of launching long lines with a maximum length of about 80 kilometers (50 miles). Perpendicular lines which carry hooks with bait are attached at intervals of about 25 meters (82 feet). The long line will be launched and hauled aboard with the help of a high-speed special winch manufactured in Japan.

The vessels will each carry a crew of 27 and are designed to remain at sea about 40 days. Reportedly, they will operate in southern Atlantic waters, landing their frozen catch in West Africa. (United States Consulate, Bremen, December 3, 1965.)



Mauritania

FISH-PROCESSING COMPLEX TO BE BUILT BY SPAIN:

Spain has agreed to construct three fish-processing plants in Port Etienne, Mauritania (West Africa), representing a capital investment of over US\$4 million. The money will be invested in return for preferential rights for Spanish fishermen in Mauritanian coastal waters. As a result, 100 to 200 Spanish fishing vessels will operate in inshore waters to supply the three plants.

To be constructed are (1) a fish-meal plant to process 100 metric tons of fish daily; (2) a canning plant with a yearly output of 3,000 tons; and (3) a salting and drying plant designed to produce 6,000 tons in its first year of operation. Construction of the meal and salting plants was to begin in November 1965.

Also called for is the construction by Spain of an administration building, houses, and schools for the plant workers and their fami-

Mauritania (Contd.):



lies. Further, the Spanish will train Mauritanian fishermen and will furnish 50 small trawlers to them. (United States Embassy, Nouakchott, October 16, 1965.)

Note: See Commercial Fisheries Review, February 1965 p. 83; July 1964 p. 67.



Morocco

TUNA FISHERY EXPANSION TRIED:

An expanded tuna fishery is desired by both Government and industry leaders in Morocco. All agree that the local industry needs larger, more modern vessels with much greater cruising range than the present fleet.

In the summer of 1964, the Moroccan Government contracted with a French group to supply the 300-ton refrigerated tuna vessel Danguy to investigate the possibilities of nearby tuna fishing grounds off Morocco. The Danguy was equipped with a purse-seine net 700 meters (2,296 feet) by 125 meters (410 feet) and carried out its research work for a year, ending the contract in September 1965. According to industry sources, the explorations of the Danguy were disappointing. Little tuna was caught in the areas investi-

gated, possibly because the Danguy encountered adverse weather and sea conditions close to the Moroccan coast.

In another attempt to expand the Moroccan tuna catch, a group of Agadir vessel owners in early 1965 sent an expedition of seven vessels to fish off Senegal and the Ivory Coast. The expedition gave the Moroccan captains and crews experience in extended long-range fishing, but it was not a financial success. The Agadir Chamber of Commerce has called for Government support for the owners of the vessels involved. The expedition reemphasized the need for larger Moroccan vessels equipped with refrigeration. (United States Embassy, Rabat, November 17, 1965.)

TANGIER CANNERY SHORT OF RAW TUNA FOR CANNING:

A tuna cannery in Tangier completed its second operating season in 1965, processing about 1,000 metric tons of bluefin tuna (Thunnus thynnus). The pack was put up in olive oil for domestic and export markets in Italy (imports 15 tons annually in 11-pound cans) and other European countries. At present, cost factors prevent the cannery from packing tuna in a style suitable for export to the United States.

A major problem for the cannery has been a shortage of tuna for canning. During May, June, and July, the cannery receives a total of about 700 tons of bluefin tuna from the madrague (fixed net) fishery off the Moroccan Atlantic coast. An additional 300 tons are trucked from Safi and Agadir to enable the cannery to operate for 6 months of the year. The average tuna caught by the madragues weighs about 400 pounds and some as much as 600 pounds each.

If it could operate year-round, the cannery could almost double its current production. Tuna supplies could be held until needed in the Tangier cold-storage plant which has freezing facilities and a cold-storage capacity of 1,100 square meters (38,846 square feet). Unfortunately, the short range of the Moroccan tuna fleet limits domestic supplies, and the importation of foreign tuna for processing and re-export is not profitable due to customs duties. (Moroccan customs authorities assess a duty on the gross weight of tuna imported even if it is to be canned for re-export.) Efforts to adapt the Moroccan tuna

Morocco (Contd.):

fleet for offshore fishing may help solve the problem. (United States Consulate, Tangier, December 1, 1965, and other sources.)

Note: See Commercial Fisheries Review, April 1964 p. 65.

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LOBSTER FISHERY INVESTMENT OPPORTUNITY:

Moroccan interests in Asilah (about 25 miles south of Tangier on the Atlantic Coast) are seeking the assistance of United States firms in developing a lobster fishing venture.

A detailed scientific study of the lobster beds off northern Morocco has never been made. According to available information, lobster fishing with traps is conducted on a commercial scale near Asilah by three French vessels during March, April, and May. The catch varies from 2,000 to 6,000 lobsters (4 to 12 metric tons) a month. About 150 large basket-like traps are fished which usually yield 4 or 5 lobsters at each haul. The French vessels weigh about 37 tons and have a hold capacity of from 600 to 700 lobsters (1.2 to 1.4 tons). The vessels are licensed by the National Maritime Fishing Office and operate in rotation to take the lobster catch to Marseilles.

Reportedly, both lobster with claws (family Homaridae) and spiny lobster without claws (family Palinuridae) are found in Moroccan waters, the latter being the most common type. The spiny lobster weigh about 4 pounds each. Lobster have been reported in Moroccan territorial waters from Tangier to Kenitra. However, the best known Moroccan area for lobster fishing is a spot of about 4 square miles located 1 mile immediately offshore from Asilah, where the ocean depth is from 10 to 20 fathoms. Other areas where lobster are said to be plentiful are near Moulay, Bousselham, and Kenitra. The ocean floor is reportedly rocky all along the coast.

Only one Moroccan fisherman in Asilah specializes in lobster fishing. He said that he has caught up to 6,000 lobsters (about 12 tons) during the season which runs from February to October. (Lobster fishing is prohibited from October 1 to February 1 by the Moroccan National Maritime Fishing Office.) However, he uses a net and does not limit his fishing to the area immediately off Asilah. He said that he has sought unsuccessful

fully to interest his fellow townsmen in forming a cooperative to build up a local industry based on lobster. They have so far been unable to raise the necessary capital, but are presently considering the possibility of obtaining credits from the Moroccan Government.

United States firms interested in more information about the lobster fishing investment opportunity should contact the United States Consulate General, No. 1, Place de la Fraternite, Casablanca, Morocco.

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EXPORT MARKETS SOUGHT FOR FISH PROTEIN CONCENTRATE:

A Moroccan fish protein concentrate (FPC) plant began trial operations in the spring of 1965. Annual production is expected to be 1,500 metric tons of FPC for human consumption. The Moroccan FPC company is seeking export markets for the bulk of its production. Although the Food and Agriculture Organization reports that the Moroccan FPC is of excellent quality, the company is having some difficulty finding markets, and production to date has been sold for animal feed. (United States Embassy, Rabat, November 17, 1965.)



Netherlands West Indies

FISHERIES TRENDS AS OF JUNE 1965:

Cold-storage facilities with a capacity of 1,100 tons of fish were completed at Saint Martin Island (located east of Puerto Rico), Netherlands West Indies, about mid-1965 by Japanese interests. In addition, 100 tons of fish can be chilled in a separate room, and another 600 tons can be stored in one of the permanently based trawlers at the pier. In all, about 50 trawlers use the pier facilities. Between 10 and 15 trawlers land their catch at Saint Martin each month. The catch is processed on the premises and exported, principally to Puerto Rico and nearby islands, and also to the United States. Previous plans for a cannery were postponed for the time being.

The catch by local fishermen in the Netherlands Antilles islands off the coast of Venezuela has not been sufficient for the demand and this has resulted in increased imports of frozen fishery products.

Netherlands West Indies (Contd.):



The cultivation of clams along the island shores is being studied, and another study indicated that shrimp would probably thrive if introduced at specific points around Willemstad in Curaçao. (United States Consulate, Curaçao, June 4, 1965.)

Note: See *Commercial Fisheries Review*, August 1964 p. 81; May 1964 p. 69.



New Zealand

SPINY LOBSTER PRODUCTION, JANUARY-APRIL 1965:

New Zealand's landings of spiny lobster in January-April 1965 totaled 3.7 million pounds valued at US\$1.4 million (£500,346), an increase of 12 percent in quantity and 61 percent in value as compared with the same period in 1964.

New Zealand (Contd.):

Landings were heaviest in January when they totaled 1.4 million pounds but dropped to about one-third that quantity in April. The ex-vessel value in 1965 was much higher than in 1964 because of the strong market for spiny lobster tails. (New Zealand Harbour and Shipping, September 1965.)



Nigeria

FROZEN FISH LANDINGS BY
FOREIGN TRAWLERS INCREASE:

Landings of frozen fish at Nigerian ports by foreign freezer trawlers have increased

sharply since the beginning of this trade in 1962.

The 1964 foreign trawler landings were over 200 percent more than in 1963.

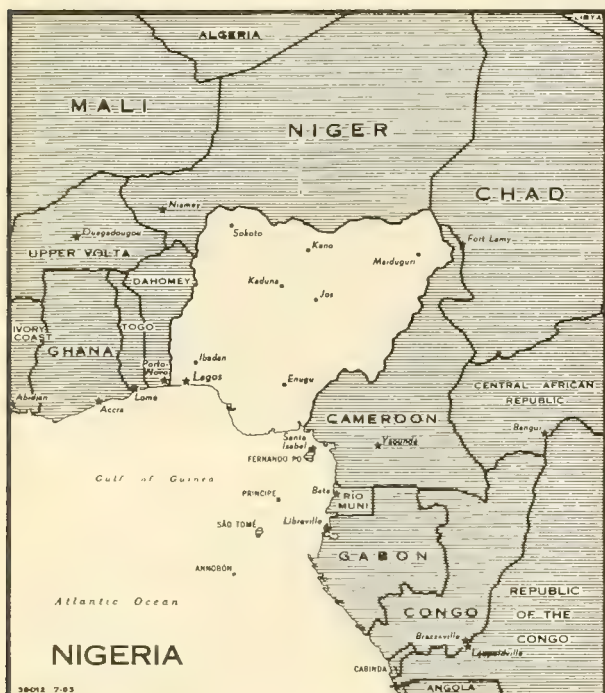
In the first half of 1965, landings by Soviet and Polish vessels were greater than in the year 1964. But there was some decline in Japanese landings in the first part of 1965.

An embargo on Japanese imports to Nigeria was imposed in the latter part of 1965. However, a Nigerian fisheries firm acquired two offshore freezer trawlers formerly used by the Japanese, and regular landings from those two vessels continued unaffected by the embargo. It therefore seemed probable that the 1965 total of frozen fish landings in Ni-

Landings of Frozen Fish by Foreign Trawlers in Nigeria, 1962-1964 and January-June 1965

Year	Japanese Trawlers			Soviet Trawlers			Polish Trawlers			Total Japanese, Soviet, and Polish Trawlers		
	Lagos	Port Harcourt	Total	Lagos	Port Harcourt	Total	Lagos	Port Harcourt	Total	Lagos	Port Harcourt	Total
	(Metric Tons)											
Jan.-June 1965 .	4,950	-	4,950	6,294	1,858	8,152	2,117	-	2,117	13,361	1,858	15,219
1964 . .	11,367	194	11,561	4,088	4,062	8,150	1,527	339	1,866	16,982	4,595	21,577
1963 . .	4,179	365	4,544	1,272	850	2,122	396	-	396	5,847	1,215	7,062
1962 . .	167	70	237	-	-	-	257	-	257	424	70	494

Source: Nigerian Port Authority.



geria would be well in excess of 1964. (Regional Fisheries Attache, United States Embassy, Abidjan, November 13, 1965.)



Norway

EXPORT SALES OF FROZEN FISH BY
COOPERATIVE GROUP AT RECORD LEVEL:

The Norwegian cooperative frozen fish marketing organization, Frionor Norsk Frosenfisk A/L, Oslo, had record home and export sales in the year ending June 30, 1965. Total sales by the firm, including subsidiary companies, were 48,300 metric tons worth US\$31 million. Exports amounted to 44,500 tons. Great Britain was the largest market. Of total production, 36,000 tons consisted of frozen fish fillets. (The Export Council of Norway, December 1965.)

Norway (Contd.):

**CANNED FISH EXPORTS,
JANUARY 1-JULY 24, 1965:**

Preliminary data show that Norway's total exports of canned fishery products during January 1-July 24, 1965, were down about 6 percent from those in the same period of 1964. Exports were somewhat lower in 1965 for smoked small sild, soft herring roe, and shellfish, but there was a small increase in shipments of brisling and kippered herring.

Norwegian Exports of Principal Canned Fishery Products, Jan. 1-July 24, 1965, with Comparisons		
Product	1965	1964
	Jan. 1-July 24	Jan. 1-July 25
	. . . . . (Metric Tons).	
Brisling	3,458	3,392
Smoked small sild . .	7,160	7,572
Kippered herring . .	1,931	1,830
Soft herring roe . .	618	982
Sild delicatessen . .	326	240
Shellfish	741	961
Other fishery products	1,539	1,757
Total	15,773	16,734

In 1965, the Norwegian canning season opened on May 1 for small sild and on May 19 for brisling. By August 14, 1965, the pack was 258,615 standard cases of small sild and 258,910 standard cases of brisling. At the same date in 1964, the pack was 262,901 cases of small sild and 299,993 standard cases of brisling. The declines were due to disappointingly small catches of brisling and small sild suitable for canning. (Norwegian Cannery Export Journal, September 1965.)

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**WHALE OIL OUTPUT DURING 1965/66
ANTARCTIC SEASON SOLD IN ADVANCE:**

The Norwegian press has reported the advance sale of all the whale oil produced by the two Norwegian expeditions during the 1965/66 Antarctic whaling season. The oil has been sold to European continental dealers and to the Norwegian marine oil hardening industry. (United States Embassy, Copenhagen, December 6, 1965.)

(Editor's Note: Output for 1965/66 is uncertain. Norway has only two whaling fleets in the Antarctic this season as compared with four fleets in 1964/65. The two Norwegian fleets operating in the Antarctic this season are reported to have produced about 17,700 metric tons of whale oil during the previous season. The Antarctic total catch quota for

all countries was reduced from 8,000 blue-whale units in 1964/65 to 4,500 units in 1965/66. By informal agreement, Norway was assigned 28 percent of the total quota in both seasons.)

Note: See Commercial Fisheries Review, Oct. 1965 p. 91; and June 1965 p. 69.

**Peru****FISH MEAL INDUSTRY TRENDS,
NOVEMBER-DECEMBER 1965:**

Anchoveta fishing improved markedly all along the Peruvian coast during the latter part of November 1965. Peruvian fish meal production in the last half of November 1965 was about 78,000 metric tons compared with only 38,590 tons during the first half of the month. (In 1964 production was 120,000 tons during the first half of November and 91,000 tons during the second half.)

The December 1965 catches included large numbers of small anchoveta which may be a sign of good catches in a few months.

Peruvian ex-vessel prices for anchoveta in early December 1965 were between US\$12 and \$14 a ton, compared with \$9 to \$10 a ton during the same period of 1964.

In early December 1965, Peruvian prices for fish meal declined to about \$150 a ton f.o.b. Peru. (United States Embassy, Lima, December 15, 1965.)

**Philippine Republic****FISH FARM DEVELOPMENT PROGRAM
TO BE FINANCED BY
AUSTRALIAN GROUP:**

The Australian Freedom-From-Hunger Campaign-Committee is to finance a 5-year fisheries program in the Philippines. Under the program, fresh-water and brackish-water fish and oyster farms are to be established to develop inland fisheries in the Philippines. (Current Affairs Bulletin, Indo-Pacific Fisheries Council, Food and Agriculture Organization, No. 43, August 1965.)



Rumania

ATLANTIC TRAWLING OPERATIONS SHIFTED TO WEST AFRICAN COAST:

In late 1965, the large Rumanian stern-trawler Galati was reported fishing for mackerel and other species off Morocco's southern coast. The vessel stopped at Casablanca for fuel and supplies. Earlier in 1965, the Galati and her sistership, the Costanta, had fished off the Atlantic coast of the United States. The Galati reportedly caught 500 metric tons of herring and some cod while in the Northwest Atlantic. (La Pêche Maritime, November 1965.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 41; and April 1965 p. 82.



South Africa Republic

FISHERIES TRENDS, AUGUST-SEPTEMBER 1965:

Pelagic Fishery: On the Cape West Coast, the main pelagic fishing season closed with a catch for January-July 1965 of 441,097 short tons (mostly pilchard, maasbanker, mackerel, and anchovy). Anchovy fishing continued, but the catch was only 5,350 tons in August 1965 and 31,204 tons in September 1965. Including incidental pilchard and maasbanker catches, the Cape West Coast total shoal catch in January-September 1965 was 478,702 tons.

In the Territory of South-West Africa, the pilchard catch was 123,618 tons in July, 73,280 tons in August, and 17,968 tons in September 1965, bringing the pilchard catch for the Territory in January-September 1965 to 730,745 tons.

The total shoal catch for the South Africa Republic and the Territory of South-West Africa combined in January-September 1965 was 1,209,447 tons.

At Walvis Bay in South-West Africa all factories had completed their pilchard quota by the end of September 1965. The regular pilchard season in South-West Africa was not expected to resume until February 1966, although one factory had a special license to take 10,000 tons of pilchard for processing as frozen fillets for domestic and export markets. None of the Walvis Bay factories planned to fish for anchovy during the off-

season, but some of the factories were looking into other fisheries such as shrimp, lobster, and groundfish.

Shrimp and Spiny Lobster: Two pilchard factories at Walvis Bay have acquired interests in a company which has a concession to investigate the shrimp and spiny lobster potential in the area north and south of Walvis Bay. The project got under way in September 1965 with exploratory fishing by the fishing vessel Takbok. At the start the work was hampered by bad weather and considerable damage was done to nets.

Another group from Walvis Bay was also exploring for spiny lobster off the coast between the Hoanib and Kunene Rivers. Their initial efforts were unproductive.

Groundfish: During the off-season for pilchard, one Walvis Bay factory was conducting groundfish operations with three line-fishing vessels and the new fiberglass trawler Benguella Stroom. Another Walvis Bay factory was fishing for groundfish with the trawlers Karin and Gnufi.

Snoek: Several of the Walvis Bay factories planned to carry out their usual snoek fishing during the off-season for pilchard.

Research: Considerable expansion is being planned for the South-West Africa Administration marine research laboratory at Walvis Bay.

The laboratory is to acquire a new 145-foot all-steel research vessel which will be equipped for oceanographic work as well as for exploratory fishing with electronic gear. It will also be used for stern-trawl investigations of the groundfish resource.

The staff of the research laboratory is to be increased from 10 to 27. Six fishery inspectors are also to be appointed. (South African Shipping News and Fishing Industry Review, October and November 1965.)

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FOREIGN FISHING OPERATIONS OFF WEST COAST, NOVEMBER 1965:

Two additional nations--West Germany and Italy--have joined the eight foreign countries with established fishing operations off South-West Africa, according to a report in

South Africa Republic (Contd.):

the Namib Times, Cape Town, November 19, 1965. At that time the foreign fleets were said to be making excellent catches about 100 miles south of Walvis Bay. The foreign fleets have mostly concentrated on groundfish and shown little interest in pilchard. In 1966, British trawlers may begin fishing off South-West Africa. More West German and Soviet trawlers are also expected.

Following is a listing of the foreign vessels operating off South-West Africa in the fall of 1965, as reported in the Namib Times, November 19, 1965.

An Italian group operates the 1,000-ton Genepesca I. The vessel formerly operated off the coast of Labrador in the North Atlantic.

West Germany is represented by the 2,145-ton factory-trawler Sagitta Maris.

Two Israeli vessels--the Azgad 2 and the Azgad 3--are operating in the South Atlantic.

There is one Japanese vessel of about 2,500 tons.

The Soviets have a fleet of over 40 vessels off South Africa. Some of those are on lease to Ghana and Poland and, although flying the flags of those countries, are still manned mainly by Russians.

Bulgaria has two known trawlers operating off South Africa--the Feniks and the Albatross. It is understood that those vessels are to be joined by another four in 1966.

Spain has over 40 vessels fishing off South Africa, and that fleet may be expanded to 150 vessels in 1966.

Belgium has the stern-trawler Narwal operating off South Africa. The vessel can process up to 25 metric tons of fish a day. In mid-November 1965, the Narwal called at Walvis Bay where she transferred 120 tons of frozen fish to the Mohasi for shipment back to Antwerp.

Note: See Commercial Fisheries Review, Dec. 1965 p. 80.

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SPINY LOBSTER TRANSPORT "GILLIAN GAGGINS" DELIVERED FOR FISHERY IN TRISTAN DA CUNHA ISLANDS:

The largest single vessel order ever placed with a South African shipyard was fulfilled

in mid-1965 when the 1,180-ton spiny lobster processing vessel Gillian Gaggins was handed over to her owners in Cape Town. The 162-foot floating factory and refrigerated transport is the largest vessel yet built for the South African fishing fleet.

Gillian Gaggins was built at a cost of about R500,000 (US\$700,000) to replace the 316-ton Francis Repetto which, with the Tristania, has been responsible for building up the spiny lobster fishing industry around the Tristan da Cunha group of islands in the middle of the South Atlantic.

The Tristan spiny lobster venture started with the expedition to the islands--Tristan da Cunha Geogh, Nightingale, and Inaccessible--of the 181-ton wooden vessel Pequena in 1948. The expedition was backed by a South African development company.

In 1949, the Pequena made her first commercial catch of spiny lobsters in the Tristan Islands, and the frozen tails she brought back were the first of a steady stream which has since flowed to markets in the United States. A year later the trawler Tristania was acquired for the operation. The pioneer ship Pequena was later withdrawn and replaced by the Francis Repetto, which in turn has now been replaced by the Gillian Gaggins, whose capacity for spiny lobster tails exceeds the total of the Francis Repetto and Tristan combined.

The Gillian Gaggins has an all-welded hull, and the latest prefabrication methods were used in her construction. The vessel has a range of 16,500 miles on one engine, or 11,700 miles on both engines. She will carry up to 75 men with fuel and supplies for extended periods. The vessel will receive spiny lobster catches and hold them at subzero temperatures until she returns to the Cape. (South African Digest, October 29, 1965.)

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FISHERIES EXHIBITION IN OCTOBER 1966 PLANNED:

South Africa's first large exhibition of fishing gear and fish-processing equipment will be held at the Goodwood Showgrounds near Cape Town, October 11-15, 1966. The exhibition will be sponsored jointly by Government and industry.

The latest developments in equipment will be displayed including echosounding and electronic fish-finding gear

South Africa Republic (Contd.):

Local and foreign suppliers are expected to exhibit.

The Southern African region offers a growing market to fishing industry suppliers. In an average year, the fishing industry in the South Africa Republic is said to need 40 or 50 new vessels. The trawling section of the industry is reported to spend R3.0 million (US\$4.17 million) a year on nets. A wide range of processing equipment is also needed.

The exhibition is timed to take place in the closed fishing season so that fishermen will be free to attend. Fishermen in the South Africa Republic, South-West Africa, Angola, Mozambique, and other fishing centers are to be invited to the exhibition.

The rate for any stand at the exhibition is R2.50 (\$3.48) per square foot. Shell stands will be provided for all exhibitors without charge. For additional information write to the South African Exhibition Organizers. (Pty.) Ltd., P. O. Box 667, Cape Town, South Africa Republic. (United States Consulate, Cape Town, November 23 and 30, 1965.)



Republic of Togo

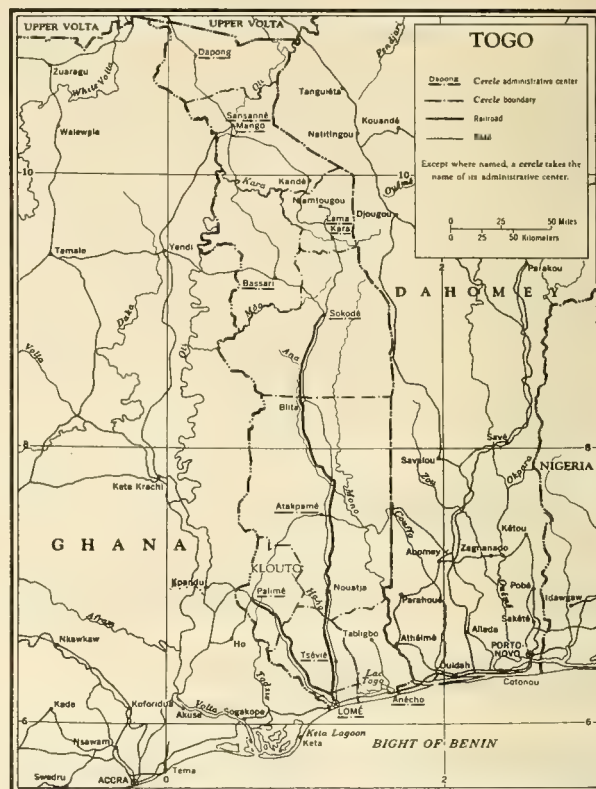
FISHERIES TRENDS, 1964-65:

Some progress was made in Togo's fisheries during 1965. By the latter part of the year, the fish dock planned for the Port of Lome was expected to be extended sufficiently so that it could provide protected docking facilities for fishing vessels.

A Togolese commercial fishery organization, the Societe Industrielle et Commerciale de Peche, was formed with local capital in early 1965, and there was interest by United States parties in the establishment of a shrimp cannery at the new port. Also, West Germany planned to provide two fishing vessels to be used for training local fishermen.

Japanese and Soviet fishing vessels operating off the African coast freeze part of their catch, and some is landed and sold along the coast. Most of the local fishing in Togo is done by villagers along the coast who either sell their catch locally or use it directly. As

a result, the catches are not recorded in official fishery statistics.



The value of Togo's fishery imports was up in 1964 but the quantity dropped 10 per cent. Exports of fishery products are negligible and in 1964 they were even less, possibly indicating increased local consumption. (United States Embassy, Lome, May 24, 1965.)



Tunisia

FISHERIES DEVELOPMENT AIDED BY SWEDISH LOANS:

In 1963, Sweden signed an agreement with Tunisia providing for financial and technical assistance to develop a fishing harbor and a vocational school to train fishermen. The project is concentrated in the Kelibia District of northeastern Tunisia. The financial aid extended by Sweden under the agreement has been in the form of development credits to enlarge pier and harbor facilities to accommodate approximately 10 fishing trawlers and

Tunisia (Contd.):

a number of smaller boats. Sweden provides three-fourths and Tunisia one-fourth of the funds for the harbor works.

The first credit of SKr. 6.0 million (US\$1.16 million) was arranged in 1963. A second loan for SKr. 6.0 million was agreed to on October 22, 1965. Tunisia is to make the equivalent of a SKr. 2.0 million (\$386,100) contribution. Both Swedish loans bear a 2-percent interest rate and a 20-year maturity including a 5-year grace period. After the grace period the repayments during the first 10 years are scheduled to amortize 5 percent of the loan annually. (United States Embassy, Stockholm, October 29, 1965.)

Note: See Commercial Fisheries Review, May 1964 p. 74.



U.S.S.R.

SOVIETS PLAN 50-PERCENT INCREASE
IN FISHERY LANDINGS BY 1970:

Soviet fishery landings of about 8.5 million metric tons in 1970 are called for by the preliminary 5-Year (1966-1970) Plan for Soviet fisheries development. Of that total, 7.8 million tons would be fish and shellfish, and the rest whales, marine animals, and other aquatic products. Most of the fish would be caught on the high seas. In 1964, the Soviet Union caught 4,475,000 tons of fish and 650,000 tons of other aquatic products. In 1965, the Sovi-

ets expected to land 5,600,000 tons of fish and other aquatic products. According to Soviet sources, most Soviet Fishery Administrations have fulfilled their individual 1965 quotas, and the actual 1965 landings may even surpass the planned estimates. (The Fishing News, London, November 19, 1965, and other sources.)

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FREEZER-TRAWLER "ZAPOLJARNYJ"
DELIVERED TO SOVIETS
BY DANISH SHIPYARD:

The 2,570-ton freezer-trawler M/S Zapoljarnyj was delivered to V/O Sudimport, Moscow, by a Copenhagen shipyard November 25, 1965. Launched March 30, 1965, the vessel is part of a series of 15 freezer trawlers for the U.S.S.R. being built by the Danish shipyard to the following specifications: length between perpendiculars 91 meters (298.5 feet), breadth 16 meters (52.5 feet), and deadweight tonnage 2,550 to 2,600 metric tons. The first vessel in the series was the M/S Skryplev launched May 10, 1962.

The Zapoljarnyj can operate as a stern trawler, but it is designed primarily to operate as a freezership, receiving catches from other trawlers. The catches are headed, gutted, and frozen aboard the Zapoljarnyj. The vessel carries two heading machines, although dressing the fish is still mainly a hand operation. For freezing, the dressed fish are placed in metal pans with firmly fastened covers and conveyed through an air-blast freezer. The use of the metal pans apparently produces smooth blocks of fairly uni-



The freezership M/S Zapoljarnyj which can also be used as a stern trawler.

U.S.S.R. (Contd.):

form dimensions. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 2, 1965.)

Note: See Commercial Fisheries Review, June 1965 p. 79.

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JAPAN LAUNCHES FIFTH IN SERIES OF FACTORYSHIPS FOR SOVIETS:

Severodonetsk, the fifth of eight 18,000-gross-ton factoryships being built for the U.S.S.R. by a Yokohama shipyard, was launched December 14, 1965. The vessel should be completed by July 1966. It will act as a mothership, supplying fuel and provisions to Soviet trawler fleets and processing their catches. Specifications of the vessel are length overall 174 meters (571 feet), depth 14.8 meters (48.5 feet), breadth 24 meters (79 feet), and main diesel engine 5,500 horsepower at 125 r.p.m. (Shipping and Trade News, December 16, 1965.)

Note: See Commercial Fisheries Review, July 1965 p. 94.

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ANTARCTIC WHALING PLANS FOR 1965/66 SEASON:

As in the previous years, the Soviet Union sent four whale factoryships (with supporting catcher vessels) to take part in the 1965/66 Antarctic whaling season which opened December 12, 1965. Two of those factoryships were from the Soviet Black Sea port of Odesa (Sovetskaia Ukraina and Slava), one from the Soviet fishing port of Kaliningrad (Iurii Dolgorukii), and one from the Far Eastern port of Vladivostok (Sovetskaia Rossia).

The 1965/66 Antarctic catch quota for all nations was cut to 4,500 blue-whale units. The Soviet share of that quota is 900 units under an informal agreement with Norway and Japan. But the quota does not apply to sperm whales, so one Soviet Antarctic fleet will hunt sperm whales only. (The Fishing News, London, November 1965.)

Note: See Commercial Fisheries Review, Oct. 1965 p. 65.



United Arab Republic

SOVIET-EGYPTIAN FISHING AGREEMENT SIGNED:

A fishing agreement between the Soviet Union and the United Arab Republic (UAR)

was signed about mid-1965, according to a Cairo press report. A Soviet delegation had been in Cairo for about a week to carry out the negotiations.

The agreement calls for the Soviet Union to supply 17,000 metric tons of fish to the United Arab Republic during the 1965/66 fishing season, with the first shipment delivered at Suez and Alexandria during summer 1965.

The agreement includes a provision for conducting research for one year in uncovering new fishing grounds in the Mediterranean. Soviet experts were to go to Egypt to develop the fisheries and to establish a fisheries training center. Also, 200 Egyptian students and fishery people are expected to be sent to the Soviet Union to study fishing methods from 5 to 7 years. On their return to Egypt they will form the nucleus of a UAR College of Fisheries.

A joint UAR-Soviet fisheries development agreement in early 1964 called for the Soviets to furnish radar-equipped fishing vessels and training, and for the Egyptians to build a community on the Red Sea coast for both Soviet and Egyptian fishermen. The project it was said would cost £E 3 million (US\$6.9 million). Soviet and Egyptian vessels are to carry out coordinated fishing activities in the south Red Sea and Indian Ocean. (United States Embassy, Cairo, June 9, 1965.)



United Kingdom

SHRIMP FISHING VENTURE IN PERSIAN GULF SUPPORTED BY MOTHERSHIP:

The 1,200-ton freezership Ross Eastern Leader was scheduled to arrive in the Per-



Ross Eastern Leader shortly before sailing for the Persian Gulf.

United Kingdom (Contd.):

sian Gulf in late January 1966 to serve as a mothership for seven 70-foot shrimp trawlers based at Bahrain. The operation is backed by a British firm and managed by United States experts.

The Ross Eastern Leader will collect and freeze shrimp catches. It has a freezing capacity of 30 tons a day and a cold-storage capacity of 300 tons. The vessel was equipped in Florida by United States outfitters.

Note: See Commercial Fisheries Review, Dec. 1965 p. 78.

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PLAICE REARING EXPERIMENT POINTS UP PROBLEMS OF MARINE FISH FARMING:

In August 1965, the British White Fish Authority began an unusual fish-farming experiment by moving some 200,000 young plaice from a hatchery in the Isle of Man to a Scottish sea loch at Ardtoe. An arm of the loch had previously been dammed in order to provide a holding pond of about 5 acres.

During transshipment from the Isle of Man, the death rate of the plaice, then about 20 millimeters (0.79 inches) in length, was low--approximately 16 percent.

The fish appeared to settle down well in their new outdoor environment and began to feed both in the holding pond, where they were kept at about 50 fish per square yard, and in the main pond, where the density was only about 5 fish per square yard.

Very soon after the introduction of the fish, however, heavy rains caused fresh water to enter the loch, and the salinity was much reduced. That, together with the large amount of organic matter which was brought down with the rain water, and the large concentration of organic matter in the sand which began to decompose, reduced the oxygen available to the fish in the water and caused heavy mortality.

Although the dam on the loch had been constructed to allow the salinity and oxygen of the nursery area to be regulated by running off the foul water and allowing fresh sea water into the enclosure, it was apparent that additional measures would have to be taken to provide ideal conditions for fish in the future.

Large numbers of predators also reduced the plaice population in the enclosure. An incursion of crab, eel, and other fish all preyed on the small plaice. This will require that either larger fish capable of avoiding the predators are introduced in the future, or that the predators are controlled more effectively.

The surviving plaice in the enclosure appeared to be growing well, and control measures were being established in readiness for the introduction of the next batch of fish in 1966.

The experiment pointed up some of the problems which have to be resolved before the new science of farming marine fish can be developed into a commercial technique of rearing plaice to marketable size. (Fishing News, October 1, 1965.)

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FREEZER-TRAWLER "OTHELLO" LAUNCHED FOR HULL FIRM:

The freezer stern-trawler Othello was launched December 9, 1965, by a Scottish shipyard in Glasgow. The Othello is the first of four similar vessels being built in Glasgow for a British fishing firm at Hull. The new vessels will be the first complete freezer-ships in the Hull firm's fleet of more than 30 trawlers.

The main particulars of Othello are: length overall 224 feet, length between perpendiculars 194 feet, breadth moulded 39 feet, depth moulded to upper deck 25 feet, depth moulded to main deck 17½ feet, speed in service 13½ knots, fishroom cold-storage capacity 27,000 cubic feet, and crew accommodations for 51.

The vessel is equipped to remain at sea 58 days.

An all welded vessel, the Othello was built in prefabricated sections weighing 40 tons each, and then assembled on the slipway.

Othello is the first British stern trawler to be arranged with the main machinery space at the after end of the vessel. This enables the cold storage space to be placed amidships. Othello is to be powered by an 8-cylinder diesel engine which develops 2,350 horsepower at 400 r.p.m. She has a controllable-pitch propeller which can be controlled from the wheelhouse.

United Kingdom (Contd.):

The design of Othello is the result of extensive investigation by the owners and builders into the plans and performances of many contemporary stern trawlers, both British and foreign. As a result of the investigation, a hull form was developed and a model underwent a series of tests at the Feltham Tank of the British National Physical Laboratory (NPL). The owner's specification called for an "easy" motion in heavy seas, and the NPL tests demonstrated that Othello and her sisterships should be good sea boats. Passive water stabilization tanks are fitted to minimize roll and improve working conditions for the crew.

The Othello has a factory deck with a large clear area where filleting machinery can be installed if it is decided to turn the vessel in-

to a factoryship at a later date. Initially, the Othello's catch will be headed and gutted, and then frozen in vertical plate freezers discharging directly into the holds.

The upper deck aft has the trawl winch 80 feet from the top of the ramp, which will allow the trawl to be brought aboard quickly. Twin fish hatches with chutes to the factory deck are provided on either side of the ramp.

A control position is provided on the aft side of the wheelhouse for the skipper when hauling in gear. From this point he can control engines, steering, and the trawl winch with a clear view of the trawl winch and the upper deck aft.



TUNA-CHUTNEY DIP

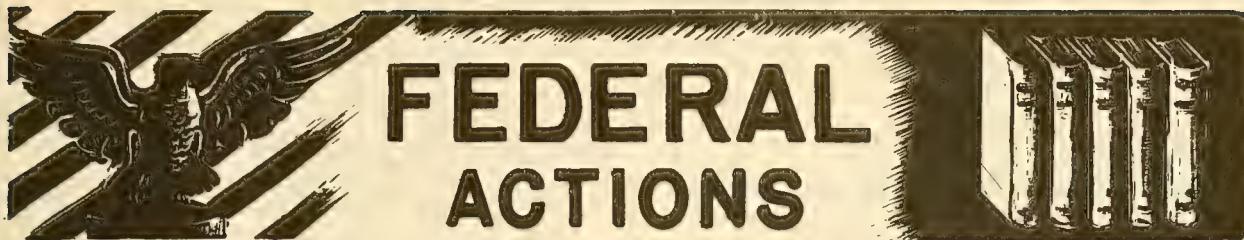
Here's a dip that's really different! You'll really keep them guessing with this one. Canned tuna, one of America's favorite foods, combines with cream cheese and chutney in the tastiest, dippiest blend yet. Dip-wise, this is a thrifty as well as delectable snack. The Tuna Research Foundation reminds us that tuna's in good supply at good prices. Stock up so you're always prepared for unexpected guests.

Tuna-Chutney Dip is a snap to fix and it's all planned to make a lot for a big party. All you have to do is blend the mild, delicate tuna chunks with the other ingredients in a simple one-bowl operation. Serve with crackers, pretzels, or chips.

TUNA-CHUTNEY DIP

2 8-ounce packages cream cheese	$\frac{1}{4}$ teaspoon cayenne
$\frac{1}{2}$ cup mayonnaise	4 cans (6 $\frac{1}{2}$ or 7 ounces each) tuna
	in vegetable oil
$\frac{1}{4}$ cup prepared mustard	$\frac{1}{2}$ cup chopped chutney

Cream together cream cheese, mayonnaise, and mustard; stir in cayenne. Add tuna and chutney; blend well. Serve with crisp crackers. Makes about 5 cups of dip.



Department of Commerce

ECONOMIC DEVELOPMENT ADMINISTRATION

FEDERAL FUNDS TO AID LAKE SUPERIOR COMMERCIAL FISHING INDUSTRY:

A sum of about \$170,000 to finance the "action phase" of a program to revive and diversify the Lake Superior commercial fishing industry was approved in December 1965 by the Economic Development Administration (EDA), U. S. Department of Commerce. The funds were included in the first projects approved by the newly established agency.

The EDA was set up under the Public Works and Economic Development Act of 1965 which provides financial assistance to create permanent new jobs in those areas of the nation suffering from high unemployment or low family income. EDA's technical assistance program, which will finance the Lake Superior project, helps provide the information needed to solve problems blocking economic growth.

The total cost of the Lake Superior program is estimated at \$200,000, with the Bureau of Commercial Fisheries, U. S. Department of Interior, paying the remainder. The traditional fishery of Lake Superior includes the northern portions of Michigan, Minnesota, and Wisconsin. Depredations by sea lampreys of lake trout and whitefish have caused a gradual decline of the fishing industry since 1954. With the near extinction of the higher value lake trout and whitefish, lower value species such as herring, smelt, chub, and alewife have become more numerous.

The EDA project is designed to develop effective means for producing, processing, and marketing the lower value species that are now abundant, thereby creating new jobs and additional income for the area.

An earlier study by the U. S. Bureau of Commercial Fisheries proposed the "action

program" which will involve setting up a pilot processing plant to produce and market new food items from Great Lakes fish that are available. Improved trawling techniques and other fishing methods will be tested.

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STUDY APPROVED TO HELP EXPAND LOUISIANA CRAYFISH INDUSTRY:

A technical assistance study to help expand the fresh-water crayfish industry in Louisiana was approved December 13, 1965, by the Economic Development Administration (EDA) of the U. S. Department of Commerce. The EDA study will be carried out over the next 12 months by the Department of Food Science and Technology, College of Agriculture, Louisiana State University, Baton Rouge.

The project, to cost about \$40,000, will determine the feasibility of establishing freezing and canning plants for processing crayfish. Such plants would increase job opportunities and income in the area by providing new outlets for an existing natural resource.

Some small-scale freezing and canning of crayfish does exist in Louisiana, but for all practical purposes, processed crayfish can be viewed as a new product in search of new markets.

Processing plants to be set up as a result of the survey would benefit present and future crayfish growers. That includes those farmers who grow and harvest crayfish in conjunction with rice farming. The plants would locate near the managed crayfish swamps, ponds, and rice farms.

The project will have a statewide impact. However, its principal economic benefit would accrue to areas in the south-central and western parts of the State, including the parishes of St. Martin, Lafayette, Acadia, Pointe Coupee, and St. Landry. Those areas qualify for financial assistance under the

EDA program because of high unemployment and low family income.



Department of the Interior

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT

FEDERAL AID AUTHORIZED FOR HURRICANE DAMAGE TO LOUISIANA OYSTER FISHERY:

In an announcement dated December 3, 1965, published in the Federal Register, December 8, 1965, the Secretary of the Interior determined that Hurricane Betsy of September 9, 1965, caused extensive damage to the Louisiana oyster resource and industry through silting, covering with marsh grass, and littering with debris of State and private oyster grounds.

The notice as it appeared in the Federal Register follows:

DEPARTMENT OF THE INTERIOR

Office of the Secretary LOUISIANA

Determination of a Fishery Failure Due to a Resource Disaster

DECEMBER 3, 1965.

Whereas, many firms and individuals are engaged in raising, harvesting, processing, and marketing oysters in the State of Louisiana; and

Whereas on September 9, 1965, Hurricane Betsy passed directly over the heart of Louisiana's oyster grounds, subjecting the area to a tidal wave and extreme winds which caused extensive damage to the oyster resource and industry through silting, covering with marsh grass, and littering with debris of State and private oyster grounds; and

Whereas, insurmountable uninsured losses of oyster production in the 1965-66 season will amount to a several million dollar decrease in State income; and

Whereas, the serious disruption of the Louisiana oyster fishery caused by alteration of habitat was due to natural causes;

Now, therefore, as Secretary of the Interior, I hereby determine that the foregoing circumstances constitute a commercial fishery failure due to a resource disaster within the meaning of section 4(b) of Public Law 88-309. Pursuant to this determination, I hereby authorize the use of funds appropriated under the above legislation to rehabilitate, restore, and put back into production the oyster grounds of the State of Louisiana, and for such other measures as may be necessary to mitigate the damage to the resource.

STEWART L. UDALL,
Secretary of the Interior.

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

REVISED U. S. STANDARDS FOR FROZEN RAW BREADED SHRIMP-- REQUIREMENTS FOR CONDITION OF COATING STILL BEING EVALUATED:

The revised U. S. Standards for Grades of Frozen Raw Breaded Shrimp are being phased in gradually. The revised standards became effective September 3, 1965, EXCEPT that the requirements for (1) uniformity and (2) degree of dehydration did not become effective until December 1, 1965, AND the requirements for condition of coating will not become effective until February 7, 1966. That delay will give the breaded shrimp industry an opportunity to submit data to support their position for modification of the condition of coating (batter and breading) provision. This involves the requirement of 50 percent of shrimp material for "regular breaded shrimp" and 65 percent of shrimp material for "lightly breaded shrimp."

The notice that the requirements for condition of coating would not become effective until February 7, 1966, published in the Federal Register, December 9, 1965, follows:

Title 50—WILDLIFE AND FISHERIES

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBCHAPTER G—PROCESSED FISHERY PRODUCTS, PROCESSED PRODUCTS THEREOF, AND CERTAIN OTHER PROCESSED FOOD PRODUCTS

PART 262—U.S. STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP

On Tuesday, August 3, 1965, there was published in the FEDERAL REGISTER, pages 9644-9647, inclusive, Part 262—U.S. Standards for Grades of Frozen Raw Breaded Shrimp.

A request has been received from the National Shrimp Breaders Association, an organization representing about 80 percent of the processors of frozen raw breaded shrimp within the United States, for modification of provision of the standard pertaining to condition of coating. It is their view that the present provision is too stringent to be met, on a practical basis. Accordingly, the first two paragraphs of page 9645 of the FEDERAL REGISTER of August 3, 1965, are hereby amended to read as follows:

This part shall become effective at the beginning of the 1st calendar day following the date of this publication in the FEDERAL REGISTER, *Except*: That the re-

quirements for condition of coating shall become effective at the beginning of the 60th calendar day following the date of this publication in the FEDERAL REGISTER. This will give the breaded shrimp industry an opportunity to submit data to support their position for modification of the condition of coating provision.

Breaded shrimp inspected and graded in accordance with this revised part between the 1st and the 60th day following the date of this publication in the FEDERAL REGISTER shall meet the requirements for condition of coating as provided in Part 262—U.S. Grade Standards for Raw Breaded Shrimp and published in the FEDERAL REGISTER (25 F.R. 8444) dated September 1, 1960, as amended by interim regulations published on page 7444 of the FEDERAL REGISTER dated June 5, 1965.

DONALD L. MCKERNAN,
Director,
Bureau of Commercial Fisheries.
DECEMBER 3, 1965.

* * * * *

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

John L. Finley, Box 2258, Kodiak, Alaska 99615, for the purchase of a new 29-foot wood seine vessel to engage in the fishery for salmon in southwestern Alaskan waters. Notice of the application was published by the U. S. Bureau of Commercial Fisheries in the Federal Register, December 4, 1965.

Parks Canning Co., Inc., 309 Colman Building, Seattle, Wash. 98104, for the purchase of a used 82.3-foot wood vessel to engage in the fishery for king crab in Alaskan waters. Notice of the application was published in the Federal Register, December 4, 1965.

Herbert H. Hunter, Jr., Star Route, Box 5, Brownsville, Tex. 78520, for the purchase of a used 61.6-foot wood shrimp trawler to engage in the fishery for shrimp in the Gulf of Mexico. Notice of the application was published in the Federal Register, December 7, 1965.

Walter E. Wallin, 2145 Notre Dame Drive, Eureka, Calif., for the purchase of a used 43-foot wood vessel to engage in the fishery for salmon, crab, shrimp, and tuna. Notice of the application was published in the Federal Register, December 8, 1965.

James Edward Johnson, 914 Fifth, Spenard, Alaska, for the purchase of a new 31-foot gill-net vessel to engage in the fishery for salmon in the Cook Inlet area of Alaska. Notice of the application was published in the Federal Register, December 8, 1965.

Chad B. Wyatt, Wrangell, Alaska, for the purchase of a used 61.4-foot wood vessel to engage in the fishery for salmon in Southeast Alaska. Notice of the application was published in the Federal Register, December 8, 1965.

Howard Clifton Aaker, Salmon Bay Terminal, Seattle, Wash., for the purchase of a used 43.5-foot registered length wood trolling vessel to engage in the fishery for salmon and albacore in the waters of the Pacific Ocean and Gulf of Alaska. Notice of the application was published in the Federal Register, December 15, 1965.

Merlin, Inc., Port Isabel, Tex. for the purchase of a used 64.5-foot registered length steel shrimp trawler to engage in the fishery for shrimp in the Gulf of Mexico. Notice of the application was published in the Federal Register, December 17, 1965.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).
Note: See Commercial Fisheries Review, January 1966 p. 101.

* * * * *

HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

The following firms have applied for fishing vessel construction differential subsidies under the Fishing Fleet Improvement Act of 1964:

Firm and address	Overall Size	Fisheries	Hearing Notice in <u>Federal Register</u> 1965	Date of Hearing 1966
Lepire Fishing Corp. 356 County St. New Bedford, Mass.	90 ft.	scallops, flounder, lobster, groundfish	Dec. 14	Feb. 1
Margaret, Inc. Reedville, Va.	172 ft.	menhaden and other herring-like fish	Dec. 14	Feb. 3
Tonnessen Fisheries, Inc. North Dartmouth, Mass.	90 ft.	scallops, flounder, lobster, groundfish, swordfish	Dec. 15	Feb. 8
Amagansett, Inc. Amagansett, Long Island, N. Y.	152 ft.	menhaden, herring and herring- like fish, red hake, and miscel- laneous species for industrial uses.	Dec. 21	Feb. 10

Hearings on the economic aspects of the applications were scheduled to be held in Washington, D. C.

By letter dated November 29, 1965, Wallace J. Boudreaux, Brownsville, Tex., wished to amend his previously approved application for a fishing vessel construction differential subsidy to aid in the construction of an 82-foot steel trawler to engage in the fishery for shrimp, including royal-red shrimp, Atlantic tuna, snapper, and spiny lobster. The request to amend the application was to increase the size of the proposed vessel to an overall length of 95 feet and to increase the engine and freezer capacity. A hearing on the amended application was scheduled to be held.

The U. S. Bureau of Commercial Fisheries published the notice of the hearing in the Federal Register, December 10, 1965.

Note: See Commercial Fisheries Review, January 1966 p. 102



U. S. Tariff Commission

COMMENTS INVITED ON IMPORT DUTIES FOR CANNED CLAMS:

The United States Tariff Commission has started, pursuant to section 332 of the Tariff Act of 1930, an investigation with respect to canned clams (Schedule 1, part 3E, headnote 1; item 114.05), which for import duty purposes are subject to the American selling price basis of valuation.

This investigation is being made to determine those rates of duty for canned clams which, in the absence of the headnote provisions cited above, would in the judgment of the Commission have provided an amount of collected duty on imports of such products during a recent period substantially equivalent to that amount provided under such headnote. The Commission is also trying to determine the degree of protection, if any, afforded by the American selling price basis of valuation.

As of late December 1965, no hearing had been ordered. However, written comments were to be submitted by interested parties to the U. S. Tariff Commission not later than January 24, 1966. The Commission expected to publish in due course a list of converted

rates of duty for canned clams, and to order a public hearing.



Eighty-Ninth Congress

(Second Session)



CONGRESS CONVENES: The second session 89th Congress convened on Jan. 10, 1966. Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

President Johnson, Jan. 12, 1966, delivered his message on the state of the Union before a joint session of both houses. The message was referred to the Committee of the Whole House on the State of the Union and ordered printed as a House document (H. Doc. 321).

ANTIDUMPING ACT AMENDMENT: H. R. 11888 (Horton) introduced in House Jan. 10, 1966, to amend the Antidumping Act, 1921; to Committee on Ways and Means.

COLORADO RIVER STORAGE PROJECT: House received Jan. 10, 1966, a letter from the Assistant Secretary of the Interior transmitting the ninth annual report on the status of the Colorado River storage project and participating projects, pursuant to 70 Stat. 105; to Committee on Interior and Insular Affairs.

COMMODITY PACKAGING AND LABELING: Introduced in House H. R. 11982 (Roybal) Jan. 12, 1966, and H. R. 12043 (Howard) Jan. 13, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce, and for other purposes; to Committee on Interstate and Foreign Commerce.

ELECTION OF MERCHANT MARINE AND FISHERIES CHAIRMAN: House Jan. 10, 1966, adopted H. Res. 630, electing Representative Garmatz of Maryland as Chairman of the standing Committee on Merchant Marine and Fisheries.

EULOGY TO REP. H. C. BONNER: On Jan. 12, 1966, numerous members of the House eulogized Rep. Bonner, Chairman of the House Committee on Merchant Marine and Fisheries for almost 11 years.

FEDERAL WATER POLLUTION CONTROL ACT AMENDMENT: H. R. 11917 (Reuss) introduced in House Jan. 10, 1966, to amend the Federal Water Pollution Control Act to authorize increased appropria-

tions for assisting construction of municipal sewage treatment works, and to strengthen authority to enforce pollution abatement; to Committee on Public Works.

H. R. 11999 (Halpern) introduced in House Jan. 12, 1966, to amend section 8 of the Federal Water Pollution Control Act to increase to \$250 million the authorization for fiscal year 1967, and to authorize reimbursement of States that prefinance certain treatment works; to Committee on Public Works. Rep. Halpern in Congressional Record, Jan. 14, 1966 (p. 125), pointed out that the bill would enable the State to set about implementing its programs immediately by authorizing reimbursement to the State of the full Federal share of the costs of eligible construction projects.

FOOD PASTEURIZATION, PROTEIN CONCENTRATE, AND FREEZE-DRY FOOD PROCESSING: Rep. Hanna in extension of remarks, Congressional Record, Jan. 12, 1966 (pp. 112-114), spoke from the floor of the House concerning new developments in food technology which can produce protein foods high in quality, low in price, and easily distributed. These three food frontiers follow:

Pasteurization of Food Products. This method involves treatment by radiation rays of certain active elements to lengthen the shelf life or storage and distribution life of foods. Experiments started some years ago and are now at a stage for dramatic application for food processing. Rep. Hanna stated that the Technological Laboratory of the U. S. Bureau of Commercial Fisheries, Gloucester, Mass., prepared a report which showed how fresh fish treated by the gamma rays reduced by 99 percent the deteriorating bacteria which causes decay, and in this sterilized condition such fish could maintain their fresh state over a sustained period without measurable loss of flavor or food quality. Rep. Hanna stated that another promising approach to food pasteurization and sterilization lies in recent experiments being conducted with high frequency waves varying from the ultrasonic to the X-ray.

Protein Concentrates: Experiments in this technology have been occurring in both cereal grains and in fish products. Congress has provided the U. S. Bureau of Commercial Fisheries with funds to tackle the technological problem of producing a defatted, dehydrated, stable fish protein concentrate under hygienic conditions suitable for human consumption. This research is now being carried out on a pilot plant scale. A Massachusetts firm is already a major private producer of fish powder which when ultimately refined is an odorless, tasteless white powder compound. The powder can be made of many varieties of fish, including many of the so-called scrap fish.

Freeze-Dry Food Processing: This process produces a food output which is extremely light of weight. The food product is first frozen, then all the water is extracted under very critical vacuum conditions. The product resulting, when packaged to prevent penetration of either moisture or air, will preserve perfectly for from 3 to 5 years. With the introduction of fresh water the food becomes reconstituted as when it was itself fresh. Already numerous plants in the United States are processing chicken, shrimp, and coffee by the freeze-dry method.

NORTHWEST ATLANTIC FISHERIES ACT OF 1950: House received Jan. 10, 1966, a letter from the Assistant Secretary for Congressional Relations, Department of State, transmitting a draft of proposed legislation to amend the Northwest Atlantic Fisheries Act of 1950 (P. L. 845-81); to Committee on Foreign Affairs.

OCEANOGRAPHY: Rep. St. Onge in extension of remarks Congressional Record, Jan. 12, 1966 (pp. A76-A77) inserted in the Record an address titled "Our Deep Sea Frontier" which was delivered by Roger Lewis, president of General Dynamics at the 63rd anniversary dinner of the Navy League of the United States, held in New York on Oct. 27, 1965.

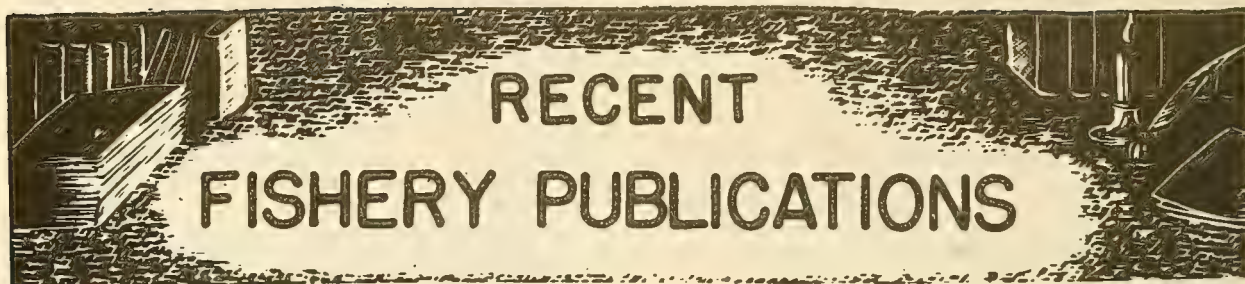
SMALL BUSINESS DISASTER LOANS: H. R. 11901 (Horton) introduced in House Jan. 10, 1966, to amend the Small Business Act to provide for increased eligibility for and greater utilization of the displaced business disaster loan program established under section 7(b) (3) of that act; to Committee on Banking and Currency.

UMPQUA PROJECT, OREGON: H. R. 11882 (Duncan of Oregon) introduced in House Jan. 10, 1966, to authorize the Secretary of the Interior to construct, operate, and maintain the Olalla division of the Umpqua project, Oregon, and for other purposes; to Committee on Interior and Insular Affairs.

WILLAMETTE RIVER PROJECT, OREGON: H. R. 11938 (Wyatt) introduced in House Jan. 10, 1966, to authorize the Secretary of the Interior to construct, operate, and maintain the Monmouth-Dallas division. Willamette River project, Oregon, and for other purposes; to Committee on Interior and Insular Affairs.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS: The U. S. Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL-3--"Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 No. Fort Myer Drive, Rm. 510, Arlington, Va. 22209. A few copies of MNL-3--"Legislative Actions Affecting Commercial Fisheries, 88th Congress, 1st Session and 2nd Session 1964," are also available upon request. Requests for this leaflet will be filled on a first-come first-served basis until the supply is exhausted.





FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES
SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SL - STATISTICAL LISTS OF DEALERS IN AND PRODUCERS OF FISHERY PRODUCTS AND BYPRODUCTS.
SSR - FISH - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

Number	Title
CFS-3778	- Industrial Fishery Products, 1964 Annual Summary (Revised), 9 pp.
CFS-3897	- North Carolina Landings, July 1965, 4 pp.
CFS-3915	- South Carolina Landings, July 1965, 2 pp.
CFS-3919	- New England Fisheries, 1964 Annual Summary, 11 pp.
CFS-3922	- Georgia Landings, July 1965, 2 pp.
CFS-3926	- Maryland Landings, July 1965, 4 pp.
CFS-3929	- Gulf Fisheries, 1964 Annual Summary, 16 pp.
CFS-3930	- Fish Meal and Oil, August 1965, 2 pp.
CFS-3932	- Maine Landings, August 1965, 4 pp.
CFS-3933	- New Jersey Landings, July 1965, 3 pp.
CFS-3934	- New Jersey Landings, August 1965, 3 pp.
CFS-3935	- Rhode Island Landings, May 1965, 3 pp.
CFS-3936	- Texas Landings, May 1965, 2 pp.
CFS-3938	- South Carolina Landings, August 1965, 3 pp.
CFS-3939	- Frozen Fishery Products, September 1965, 7 pp.
CFS-3940	- Hawaii Fisheries, 1964 Annual Summary, 4 pp.
CFS-3941	- Michigan, Ohio & Wisconsin Landings, July 1965, 4 pp.
CFS-3943	- Alabama Landings, August 1965, 3 pp.
CFS-3944	- Maryland Landings, August 1965, 4 pp.
CFS-3945	- Massachusetts Landings, February 1965, 7 pp.
CFS-3947	- Rhode Island Landings, June 1965, 3 pp.
CFS-3948	- New York Landings, August 1965, 4 pp.
CFS-3949	- Louisiana Landings, August 1965, 3 pp.
CFS-3950	- Massachusetts Landings, March 1965, 7 pp.
CFS-3951	- Shrimp Landings, April 1965, 5 pp.
CFS-3952	- California Landings, July 1965, 4 pp.
CFS-3953	- North Carolina Landings, September 1965, 4 pp.
CFS-3955	- Florida Landings, September 1965, 8 pp.
CFS-3956	- Mississippi Landings, July 1965, 3 pp.

CFS-3957 - Fish Meal and Oil, September 1965, 2 pp.
CFS-3958 - Mississippi Landings, August 1965, 3 pp.
CFS-3959 - Gulf Coast Shrimp Data, April 1965, 19 pp.
CFS-3963 - Michigan, Ohio & Wisconsin Landings, August 1965, 4 pp.
CFS-3964 - Rhode Island Landings, July 1965, 3 pp.
CFS-3965 - New Jersey Landings, September 1965, 3 pp.
CFS-3968 - Texas Landings, June 1965, 3 pp.

SL-22 - Wholesale Dealers in Fishery Products, Oregon, 1964 (Revised), 4 pp.

Sep. No. 749 - New Approaches to Quality Changes in Fresh-Chilled Dressed Halibut.

Sep. No. 750 - Wade Seine Construction and Method of Use.

Sep. No. 751 - Technical Note No. 2 - An Inexpensive Scallop Cleaner Built from Spare Parts

SSR-Fish. No. 506 - Table of Sigma-t and Intervals of 0.1 for Temperature and Salinity, by Betty Ann L. Keala, 187 pp., April 1965.

SSR-Fish. No. 510 - Collections by the Exploratory Fishing Vessels Oregon, Silver Bay, Combat, and Pelican, Made During 1956-1960, in the Southwestern North Atlantic, by Harvey R. Bullis, Jr., and John R. Thompson, 133 pp., Aug. 1965.

SSR-Fish. No. 514 - Biological-Statistical Census of the Species Entering Fisheries in the Cape Canaveral Area, by William W. Anderson and Jack W. Gehring-er, 89 pp., illus., July 1965.

SSR-Fish. No. 516 - Distribution of Fishes in U. S. Streams Tributary to Lake Superior, by Harry H. Moore and Robert A. Braem, 65 pp., illus., July 1965.

Annual Report of the Bureau of Commercial Fisheries Technological Laboratory, Gloucester, Mass., for the Fiscal Year Ending June 30, 1963, by Joseph W. Slavin, Circular 231, 17 pp., processed. Provides summaries of research on the chemistry and biochemistry of fish; preservation and processing; standards and specifications research and development; radiation-pasteurization; and inspection and certification of fishery products. Also lists publications and papers presented at meetings.

Biological Laboratory, Galveston, Texas, Fishery Research for the Year Ending June 30, 1964, Circular 230, 113 pp., illus., processed, 1964. An annual progress report on some of the research highlights

for the year. Includes a section that discusses research on the distribution, abundance, and ecology of commercially important shrimp, and the shrimp dynamics program. The section on industrial fish discusses life histories of north-central Gulf bottomfish and western Gulf bottomfish resources. The estuarine program, experimental biology program, and operation and maintenance of salt-water laboratories are also reported upon.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, October 1965, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, October 1965, 12 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, September and October 1965, 9 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Rm. 608, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, oil, and solubles; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex.; and sponge sales; for the months indicated.

Halibut and Troll Salmon Landings and Ex-Vessel Prices for Seattle, Alaska Ports and British Columbia, 1965-1964, 35 pp., 1965. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Bldg., Seattle, Wash. 98104.) Gives landings and ex-vessel prices of troll salmon and halibut at leading United States ports of the Pacific Coast; ex-vessel halibut prices and landings at leading British Columbia ports; United States and Canadian Pacific Coast halibut landings, 1936-1965, halibut landings at leading Pacific Coast ports, 1962-1965; and troll salmon landings and receipts at Seattle and Alaska ports, 1962-1965.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, October 1965, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, P. O. Box 447, Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads,

Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--August, September, and October 1965, 19 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the months indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, October 1965, 9 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

New England Fisheries--Monthly Summary, October 1965, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

THE FOLLOWING SERVICE PUBLICATION IS FOR SALE AND IS AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

The Progressive Fish-Culturist, vol. 27, no. 4, October 1965, 74 pp., processed, single copy 25 cents. Some of the articles are: "The design, operation, and testing of a photoelectric fish egg counter," by Allen S. Davis and Gerald J. Paulik; "Observations on grass carp in Arkansas," by James H. Stevenson; "Preliminary studies with grass carp for aquatic weed control," by James W. Avault, Jr.; "Grass carp for weed control," by F. T. K. Pentelov and B. Scott; "Coho salmon smolts in ninety days," by Robert L. Garrison; "Tags for marking king crabs," by George W. Gray, Jr.; and "Tank facilities for tuna behavior studies," by John J. Magnuson.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALASKA:

The following Statistical Leaflets available from Alaska Department of Fish and Game, Subport Bldg., Juneau, Alaska:

Alaska Commercial Fisheries Catch and Production Statistics, 1964, No. 9, 30 pp., processed, September 1965.

Alaska Commercial Fishery Operators, 1964, No. 8, 23 pp., processed.

AMINO ACIDS:

"Free amino acids in the muscle of a few species of fish," by Shoji Konosu, Yoshiro Hashimoto, and Muzaffer Ozay, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, Nov. 1964, pp. 930-934, printed in Japanese and English. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

ARGENTINA:

"La industria pesquera Argentina" (The fishing industry of Argentina), article, Pesca y Marina, vol. 17, no. 5, Oct.-Nov. 1965, pp. 4, 6-8, 10, illus., printed in Spanish. Fernando Flores Ltda., 705 N. Windsor Blvd., Los Angeles 38, Calif.

BONEFISH:

Bonefishing, by Stanley M. Babson, 128 pp., illus., printed, 1965, \$4.95. Harper and Row, Publishers, Inc., 49 East 33rd Street, New York 16, N. Y. The first complete book on catching bonefish. Tells where to find them, fishing techniques and tackle, selecting guides, and record catches. Offers solid advice and good reading for experienced fisherman and novice. Although bonefish are distributed in many parts of the world, at present Florida, the Caribbean, and the coastal waters off South America are the principal areas for fishing bonefish. The author describes studies at laboratories in Bimini (the Bahamas), the American Museum of Natural History, and the International Oceanographic Foundation at Miami. Presents the most up-to-date natural history of the bonefish. The book has an index.

BOTULISM:

"The botulism problem in seafoods," by Harold B. Allen, article, Proceedings of the Gulf and Caribbean Fisheries Institute, Seventeenth Annual Session, Nov. 1964, pp. 32-36, printed. Gulf and Caribbean Fisheries Institute, The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami, Fla. 33149.

BRAZIL:

"Observações colhidas em nucleos pesqueiros de Alagoas, Sergipe e Bahia" (Observations on fishing centers in Alagoas, Sergipe and Bahia), by Bento F. Grangeiro, article, Boletim de Estudos de Pesca, vol. 3, no. 11/12, 1963, pp. 3-12, printed. Boletim de Estudos de Pesca, Rio de Janeiro, Brazil.

CALIFORNIA:

Ocean Sportfish Catch and Effort from Oregon to Point Arguello, California, July 1, 1957-June 30,

1961, by Daniel J. Miller and Daniel Gotshall, Fish Bulletin 130, 135 pp., illus., printed, 1965. Department of Fish and Game, The Resources Agency, Sacramento, Calif. 95814. (Sold by Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.)

CANADA:

Fisheries Statistics, Quebec, 1963, 36 pp., illus., printed in French and English, October 1963, 75 Canadian cents. Queen's Printer and Controller of Stationery, Ottawa, Canada.

CASPIAN SEA:

On the Importance of the Herring-Gull in the Fishing of the Caspian Sea, by N. A. Gladkov and V. S. Zaletayev, 11 pp., processed. (Translated from the Russian Voprosy Ikhtologii, no. 4, 1955, pp. 180-187, printed.) Zoological Museum, Moscow University, Moscow, U.S.S.R.

CEYLON:

The Marine and Fresh Water Fishes of Ceylon, by Ian S. R. Munro, 367 pp., 56 plates, illus., printed, 1955. Department of External Affairs, Canberra, Australia.

CHESAPEAKE BAY:

Chesapeake Science, vol. 6, no. 3, September 1965, pp. 125-140, illus., printed, single copy 75 cents. Natural Resources Institute, University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. Includes, among others, these articles: "Sex Determination of Live Striped Bass *Morone saxatilis* (Walbaum), by Biopsy Technique," by Douglas E. Ritchie; "Effect of Metallic Aluminum Particles on Oysters and Clams," by Robert W. Hanks; "Field Tests of Herbicide Toxicity to Certain Estuarine Animals," by Charles K. Rawls; "Larval Development of a Boring Clam, *Barnea truncata*," by Paul E. Chanley; and "Observations on Tag Loss and Comparative Mortality in Striped Bass," by Rupert R. Bonner, Jr.

CLAMS:

"Frozen clams offer potential if intelligently exploited," by Duane D. Shelton, article, Quick Frozen Foods, vol. 27, Feb. 1965, pp. 293-294, 297-299, printed. E. W. Williams Publications, Inc. 1776 Broadway, New York, N. Y. 10019.

COD:

"Effect of magnesium in salting of cod," by D. P. Sen and A. Aitken, article Journal of Food Science, vol. 30, Mar.-Apr. 1965, pp. 286-287, printed. Institute of Food Technologists, 510-522 No. Hickory St., Champaign, Ill. 61823.

"Polyphosphate treatment of frozen cod. 3--Taste panel evaluation, chemical assessment and thaw-drip in once-frozen Newfoundland trap-caught cod," by W. A. MacCallum, D. A. Chalker, and J. T. Lauder, article, Journal of the Fisheries Research Board of Canada, vol. 21, Nov. 1964, pp. 1397-1402, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

DEMERSAL FISH:

"Demersal fishes and fisheries of the northeastern Pacific Ocean," by A. T. Pruter, article, Transactions of the North American Wildlife and Natural Resources Conference, vol. 29, 1964, pp. 382-392, printed. Wildlife Management Institute, Wire Bldg., Washington, D. C. 20005.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

EELS:

"Export of eels big overseas earning potential," article, Commercial Fishing, vol. 4, no. 1, September 1965, pp. 7, 9, printed. Trade Publications Ltd., 26 Albert St., Auckland, New Zealand.

EXOTIC FISH:

The Book of Exotic Fish, by R. and M. L. Bauchot, 95 pp., illus., printed, 1964. Stein and Day (Publishers), 7 East 48th St., New York, N. Y. 10017.

EXPORTS:

Available from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402:

"Exports by U. S. fisheries reach record, new data show," by J. M. Shea, article, International Commerce, vol. 71, no. 44, Nov. 1, 1965, p. 6, illus., printed, single copy 35 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C.

What You Should Know about Exporting--A How to Get Started Handbook, 46 pp., illus., printed, September 1965, 20 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. Informs the U. S. businessman on how to help himself and his Government expand exports to achieve a more favorable balance of payments position and to maintain high levels of employment and profits here at home while strengthening ties with friends and allies throughout the Free World. Discusses pinpointing markets, channels for trading, picking overseas partners, financing, insurance, regulations, handling orders, and promoting export sales. Presents a list of helpful pamphlets and articles on the subject.

FISH CULTURE:

Nutrition of Fish and Feedstuffs for Fish Culture, by Yoshiro Hashimoto and Tomotoshi Okaichi, No. 9, Parts I and II, 70 and 43 pp., respectively, illus., printed in Japanese. Japan Fisheries Conservation Association, Zenkoku Choson Kaikan Bldg., 1-17, Nagata-Cho, Ciyoda-Ku, Tokyo, Japan.

FISH FARMING:

"Britain's first sea fish farm," by Robert Barton, article, Australian Fisheries Newsletter, vol. 24, no. 11, November 1965, pp. 29, 31, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia.

The Fish Farmer, vol. 1, no. 1, November 1965, 11 pp., illus., printed. American Fish Farmers Federation, Lonoke, Ark. (Available from The Fish Farmer, 1378 South Livermore Ave., Livermore, Calif. 94550.) The first issue of this periodical tells about the formation of the American Fish Farmers Federation, its functions and aims to help the fish farming business. A statement of aims and purposes tells what must be done in the future to build an industry. An article on legislation tells a little of what has been done in the past for the fish farmer. A list of fish dealers and haulers is included.

FISH MEAL:

"To compare the differences in growth rate and feed efficiency in chicks by replacing antibiotics plus

fish meal with that of poultry litter," by G. P. Agarwala, article, Indian Poultry Gazette vol. 48, no. 4, Jan. 1965, pp. 106-109, printed. Indian Veterinary Research Institute, Izatnagar, Up. India.

FISH PROTEIN CONCENTRATE:

"Supplementary value of a blend of cottonseed flour and fish flour on certain indigenous cereals," by S. S. M. Ali, A. Razzaq, and M. Jamil, article, Pakistan Journal of Scientific Research, vol. 16, no. 3/4, July-Oct. 1964, pp. 136-137, printed. Pakistan Association for the Advancement of Science, Lahore, Pakistan.

"Technological developments in the field of fish flour (Part VI), article, Balık ve Balıkçılık, vol. XIII, no. 9, September 1965, pp. 16-21, printed in Turkish. Balık ve Balıkçılık, Et ve Balık Kurumu G. M., Balıkçılık Mudurlugu, Besiktas, Istanbul, Turkey.

FISH SOLUBLES:

"Studies on fish-solubles. II--Nutritive value of commercial fish-solubles in rats and mice," by Toshio Onishi, Shigeo Murayama, and Takashi Kaneda, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 31, Jan. 1965, pp. 51-59, printed. Japanese Society of Scientific Fisheries, Shiba Kai-gandori 6, Minato-ku, Tokyo, Japan.

FLOUNDER:

"Growth studies of winter flounder, Pseudopleuronectes americanus (Walbaum), in Rhode Island," by Richard J. Berry, Saul B. Saila, and Donald B. Horton, article, Transactions of the American Fisheries Society, vol. 94, no. 3, 1965, pp. 259-264, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

FOOD AND AGRICULTURE ORGANIZATION:

Publications available free from the Fishery Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy:

Bulletin of Fishery Statistics, No. 4--Tunas, Bonitos, Skipjacks, 1937-38, 1947-63; 34 pp., processed in French, Spanish, and English, 1964.

Bulletin of Fishery Statistics, No. 5--Summaries: Catches and Landings, 1963, 37 pp., processed in French, Spanish, and English, 1964.

Bulletin of Fishery Statistics, No. 6--Catches in the North Atlantic, 1963, 73 pp., processed in French, Spanish, and English, 1965.

FRANCE:

"Nécessité d'une organisation valable des pêches européennes et extension des eaux réservées françaises à douze milles" (Need for a valid organization of European fisheries and extension of French territorial waters to twelve miles); "La productivité de la pêche française est inférieure à celle de la pêche allemande, mais l'écart est moins important qu'on le croit" (French fishery production is less than that of the German fishery, but the difference is less important than it is thought), by B. Albert Boyer, articles, La Pêche Maritime, vol. 44, no. 1050, Sept. 1965, pp. 657-658, 661-662, illus., printed in French, single copy 15 F. (about US\$3). Les Editions Maritimes, 190, Blvd. Haussmann, Paris, France.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Ont inauguré la campagne de la 'marée du mardi'" ("Eat fish on Tuesday" promotion launched), by Jean Morin and Jacques Huret, article, *La Pêche Maritime*, vol. 44, no. 1051, October 1965, pp. 737-738, illus., printed in French, single copy 15 F. (US\$2.85). *La Pêche Maritime*, 190 Boulevard Haussmann, Paris 8e, France.

Science et Pêche, no. 139, July-Aug. 1965, 20 pp., illus., printed in French, single copy .50 F. (about 10 U.S. cents). L'Institut Scientifique et Technique des Pêches Maritimes, 59 Avenue Raymond-Poincaré, Paris (16^e), France. Articles included are: "Étude des fonds de pêche des Îles Baléares, campagne de l' (Ichthys), Avril-Mai 1965" (Study of fishing depths off the Balearic Islands. Ichthys cruise--April-May 1965), by Cl. Maurin and H. Scoffoni; "Essais préliminaires de pêche des anchois à la lumière dans le Golfe de Gascogne" (Preliminary fishing tests with lights in the Gulf of Gascony), by Georges Kurc; and "La campagne harengière 1964-65 dans le pas-de-calais et l'évolution récente du stock de harengs dans cette région" (The 1964/65 herring season in the Straits of Dover and the recent status of the stock of herring in that region), by Alain Maucorps.

Selling in France, by Alexander Dauman, OBR 65-73, 18 pp., printed, October 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

FRESHNESS TESTS:

Testing the Freshness of Frozen Fish (A review of biochemical indices of quality in fish, with special reference to frozen products), by Edith Gould, 51 pp., printed, 17s. 6d. (about US\$2.75). Fishing News (Books) Ltd., 110 Fleet Street, London, EC4, England. "Over the past quarter-century," states the author, "many attempts have been made to establish a reliable test for the degree of freshness in frozen fishery products. As yet, no objective test has been discovered that correlates satisfactorily with the subjective taste panel method." The author points out that papers commenting on one or more of the many existing tests are published each year. Because of the diversity in experimental conditions and specimens and because of differing reports in the literature, periodic reviews are almost mandatory, in order that the fishery scientist may avoid fruitless lines of experimentation and may determine the more promising directions for his own research. The primary purpose of this paper is to catalogue the objective tests in the literature, with an eye to their use for frozen fishery products. A secondary purpose is to indicate likely starting-places from which to proceed in the search for an index. Necessarily, occasional brief mention is made of the biochemical background, an indispensable adjunct to the research itself. In presenting the development of existing indices, the author groups existing tests into these arbitrary classifications: bases, acids, sugars, lipides, nucleotides, proteins, enzymes, and miscellaneous. The enzymes are considered separately from the other proteins. The analytical listing of past research in this book meets a long-felt need. Besides considering and cataloging the existing tests (principally for

fresh or iced fish), varying shades of informed opinion are reported and each test is weighed for possible use with frozen fish.

GEAR:

Modern Fishing Gear of the World 2, 619 pp., illus., printed in English and French with French, Spanish and English abstracts, June 1964, £ 6 15s. (about US\$18.85). Fishing News (Books) Ltd., Ludgate House, 110 Fleet St., London EC4, England. Contains papers presented at the World Congress on Fishing Gear organized by the Food and Agriculture Organization of the United Nations, held at London, May 25-30, 1963. The discussions arising from the papers were recorded, edited, and are also included. The more than 80 papers are grouped in three parts. Part I--materials for nets and ropes--comprises four sections in which are given 18 papers, including those on terminology and standardization of numbering systems; test methods for fishing gear materials, nets, and twines; new net materials and knotless nets and monofilaments. Part II deals with bulk fish catching, and its eight sections cover stern trawling, bottom trawling, midwater trawling, gill-netting, long-lining and traps, purse-seining, deck machinery, fish detection, and fleet operations. Part III--technical research in four sections, comprising 20 papers--deals with gear research, instruments for testing gear, fish behavior in relation to nets, trawls, and mechanical stimuli, electrical fishing, and science and the future. A detailed index completes the book. It will be a valuable addition to the library of the commercial fisherman, an excellent reference for those engaged in exploratory fishing and gear research, and good background for fishing vessel owners and others interested in fisheries.

GERMAN FEDERAL REPUBLIC:

Berichte der Deutschen Wissenschaftlichen Kommission für Meeresforschung, new series, vol. 18, no. 1, 1965, 109 pp., illus., printed in German with summaries in English and Spanish. DM 44.60 (about US\$11.25). Verlag Paul Parey, Spitalerstrasse 12, 2 Hamburg 1, German Federal Republic. Contains, among others, these articles: "Der Beifang in den Fangen der deutschen Garnelenfischerei in den Jahren 1954-60" (Incidental catches in the German shrimp fishery 1954-60), by Von P. F. Meyer-Waarden and K. Tiews; "Über die Verbreitung der Fischbrut in der Südlichen Nordsee und im östlichen Englischen Kanal im Winter" (On the diffusion of fish fry (spawn) in the southern North Sea and eastern English Channel in Winter), by Von I. K. Oray.

GROUND FISH:

Serial Atlas of the Marine Environment--Autumn Distribution of Groundfish Species in the Gulf of Maine and Adjacent Waters, 1955-1961, by Raymond L. Fritz, Folio 10, illus., printed, 1965, looseleaf \$5, bound \$8. Serial Atlas of the Marine Environment, American Geographical Society, Broadway at 156th St., New York, N. Y. 10032.

GULF OF MEXICO:

"Length-weight relationships of some Gulf of Mexico fishes," by C. E. Dawson, article, *Transactions of the American Fisheries Society*, vol. 94, no. 3, 1965, pp. 279-280, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

HADDOCK:

"Seasonal food habits of Highlands Ground haddock," by Roland L. Wigley, article, Transactions of the American Fisheries Society, vol. 94, no. 3, 1965, pp. 243-251, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

HAKE:

Conditioning of Hake Processing Effluents, by S. G. Wiechers, and others, Progress Report No. 83, 9 pp., processed, July 1965. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, South Africa Republic.

HANDLING AND PROCESSING:

The Technology of Fish Utilization (Contributions from Research), edited by Rudolf Kreuzer, 302 pp., illus., printed, 1965, £5 5s. (about US\$14.70). Fishing News (Books) Ltd., Ludgate House, 110 Fleet St., London EC4, England. A most comprehensive, stimulating, and valuable book for scientists and operators engaged in the handling and processing of fish. In May 1964 about 100 scientists and technologists held a symposium ("On the Significance of Fundamental Research in the Utilization of Fish") at Husum, Federal Republic of Germany, under the auspices of the Fisheries Division, FAO. This book is a collection of the 60 papers presented by scientists at that meeting under six principal subjects: rigor mortis in fish; problems related to the preservation of fresh fish; control of deteriorative changes in frozen fish; measuring the degree of freshness of fish; production and storage of fish protein concentrate; and dehydration and canning of fish. Also reported are the discussions that followed the presentation of the papers under a particular subject. This resulted in a survey of (1) what is required to solve the problems discussed and (2) what so far has been done about them. The book concludes with summaries from the viewpoint of (1) industry, (2) applied research, and (3) fundamental research. Contains an adequate index.

HERRING:

"A new genus and subgenus of clupeid fishes and notes on the genera Clupea, Sprattus and Clupeonella," by P.J.P. Whitehead, article, Annals and Magazine of Natural History, vol. 7, no. 78, 1964, pp. 321-330, illus., printed. Taylor & Francis Ltd., Red Lion Court, Fleet St., London EC4, England.

"A tag for young herring," by John E. Watson, article, Underwater Naturalist, vol. 2, no. 2, 1964, pp. 6-8, illus., printed. American Littoral Society, Sandy Hook Marine Laboratory, Highlands, N. J.

"A technique for mounting and storing herring otoliths," by John E. Watson, article, Transactions of the American Fisheries Society, vol. 94, no. 3, 1965, pp. 267-268, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

INDIA:

"A new element in the commercial fishery of Chilka Lake," by A. V. Natarajan and K. L. Shah, article, Science and Culture, vol. 29, no. 10, 1963, pp. 513-514, illus., printed. Indian Science News Association, 92 Upper Circular Rd., Calcutta 9, India.

Articles from Indian Fisheries Bulletin, vol. X, printed, Re. 1 (about 21 U.S. cents) per issue. Department of Food, Ministry of Food and Agriculture, New Delhi, India:

No. 1, January 1963--"Development of Indian fisheries during the year 1962-63"; "Progress of INP for the year 1961-62"; "Exploratory and experimental fishing"; and "From research laboratories"; pp. 1-14.

No. 2, April 1963--"A preliminary report on the exploratory fishing operations in the Gulf of Mannar (1959-1961)"; "Review of the progress of work of Indo-Norwegian Project during the year 1962-63"; "Mark-recovery experiments and techniques of marking shrimps"; "From research laboratories"; and "Exploratory and experimental fishing"; pp. 1-27, 32-38.

INDUSTRIAL PRODUCTS:

"El dosaje de calcio y de fosforo en harinas y solubles de pescado" (The amount of calcium and phosphorous in fish meals and fish solubles), by Johann Firbas and Giulio Vaccari, article, Boletim de la Sociedad Quimica del Peru, vol. 30, no. 3, 1964, pp. 93-97, printed. Sociedad Quimica del Peru, Casilla 891, Lima, Peru.

Fisheries By-Products, 1950-1963, by R. G. Ackman and P. M. Jangaard, New Series Circular No. 19, Sept. 3, 1964, 7 pp., printed. Fisheries Research Board of Canada, Technological Research Laboratory, Halifax, Nova Scotia, Canada.

INTERNATIONAL COMMISSIONS:

International Commission for the Northwest Atlantic Fisheries, Research Bulletin 2, 82 pp., illus., printed, 1965. International Commission for the Northwest Atlantic Fisheries, Bedford Institute of Oceanography, P. O. Box 638, Dartmouth, N. S., Canada.

IRRADIATION PRESERVATION:

"Acceptability of irradiated fish and shellfish," by Nancy Stoll and David Miyauchi, article, Journal of the American Dietetic Association, vol. 46, Feb. 1965, pp. 111-115, printed. American Dietetic Association (Nutrition), 620 N. Michigan Ave., Chicago 11, Ill.

ITALY:

Bollettino di Pesca, Piscicoltura e Idrobiologia, vol. 40, no. 19, July-December 1964, pp. 199-298, illus., printed in Italian with French and English summaries, single copy L. 800 (about US\$1.30). Laboratorio Centrale di Idrobiologia, Piazza Borghese, 91, Rome, Italy. Some of the articles are: "Su alcuni caratteri chimici dei mitili (*Mytilus galloprovincialis* Lamarck) coltivati nel Mar Piccolo e nel Mar Grande (Golfo di Taranto) (On some chemical characteristics of the mussel (*Mytilus galloprovincialis* Lamarck) cultivated in the Small Sea and Big Sea (Gulf of Taranto), by Angelo Strusi; "Contributo allo studio della morfologia e della biologia della Sardina della Manica" (Contribution on the study of morphology and biology of the English Channel sardine), by Francesco Matta; "Marine electrical fishing," by Sergiu Schapira; "Studi sulla biologia e pesca di *Xiphias gladius* L." (Study on the biology of the swordfish (*Xiphias gladius* L.), by Antonino Cavaliere; and "La mitilicoltura nello Stagno di Thau" (Mussel culture of the Thau estuary), by Francesco Matta.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

IVORY COAST:

"La Côte d'Ivoire, qui a reçu en 1964 53,000 t de poisson de pêche locale, a d'importants projets de développement de son industrie de la pêche" (The Ivory Coast, which has landed 53,000 metric tons of fish from the domestic fishery in 1964, has some important development projects in its fishing industry), article, *La Pêche Maritime*, vol. 44, no. 1050, Sept. 1965, pp. 666-668, illus., printed in French, single copy 15 F. (about US\$3). Les Editions Maritimes, 190, Blvd. Haussmann, Paris, France.

JAPAN:

On the Reclamation Work and the Countermeasures for Occupational Change of Fishermen in Oita Sea-side Industrial Area, by Hajimu Tanaka, No. 5, 38 pp., illus., printed in Japanese. Japan Fisheries Conservation Association, Zenkoku Choson Kaikan Bldg., 1-17, Nagata-Cho, Ciyoda-ku, Tokyo, Japan.

KENYA:

Basic Data on the Economy of Kenya, by Robert L. Ware, Jr., OBR 65-75, 16 pp., printed, November 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

LOUISIANA:

"Effects of hurricane 'Betsy' on Louisiana's seafood industry," by Lyle S. T. Amant, article, *Louisiana Conservationist*, vol. 17, nos. 11 & 12, Nov.-Dec. 1965, pp. 5-7, 21, illus., printed. Louisiana Conservationist, Wild Life & Fisheries Bldg., 400 Royal St., New Orleans, La. 70130.

MARINE MAMMALS:

Marine Mammals of California, by Anita E. Daugherty, 87 pp., illus., printed, 1965. Department of Fish and Game, Resources Bldg., 1416 9th St., Sacramento, Calif. 95814. The introduction discusses the economic worth of marine mammals and their value to biologists. Succeeding chapters cover modification of marine mammals; whales and dolphins (Cetacea); sea lions, fur seals, hair seals, and walruses (Pinnipedia); the sea lion controversy; Cetacean; tooth counts; meanings of scientific names, and marine mammal checklist. The species described, with accompanying drawings and photos, include the Pacific right, little piked, sei, blue, finback, humpback, gray, pilot, killer, sperm, pygmy sperm, Baird's beaked, and Cuvier's beaked whales; common, Risso's, striped, right whale, spotted, long-beaked, rough-toothed, and bottlenose dolphins; the harbor and Dall porpoises; Guadalupe fur, northern fur, ribbon, elephant, and harbor seals; stellar and California sea lions; and the sea otter.

MARINE OIL:

"Spectrophotometric studies on shark liver oil from the Red Sea," by M. K. Salah and M. M. Abdallah, article, *Chemical Abstracts*, vol. 62, April 12, 1965, Abstract No. 9363d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

MARINE RESOURCES:

Marine Resources of the Atlantic Coast (a new series of leaflets designed to present up-to-date research findings and scientific knowledge of marine species

taken in commercial and sport fisheries along the Atlantic Coast), 4 pp. each, illus., printed, October 1965. Atlantic States Marine Fisheries Commission, 336 East College Ave., Tallahassee, Fla. 32301:

Leaflet No. 1--Introducing a Marine Resources Leaflet Series.

Leaflet No. 2--Atlantic Menhaden--A Most Abundant Fish.

Leaflet No. 3--The Soft-Shell Clam--A Resource with Great Potential.

Leaflet No. 4--Southern Shrimp--A Valuable Regional Resource.

MARKETING:

"A better way of marketing fish," by E. A. Ruthford, article, *Quick Frozen Foods*, vol. 27, Feb. 1965, pp. 148-149, printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019.

MEXICO:

Establishing a Business in Mexico, by Katherine E. Rice, OBR 65-71, 20 pp., printed. October 1965, 15 cents. U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A report to assist businessmen interested in establishing an enterprise in Mexico. A generally accepted principle is that foreigners have the right to invest in Mexico and to withdraw the profits and proceeds provided they do so in accordance with Mexican laws. In addition to investment policy, the report discusses entrance and rights of aliens, business organization law, and taxation regulations. It also covers licensing agreements; patents, trademarks, and copyrights; labor legislation; and United States taxation of income earned in Mexico.

MISSISSIPPI RIVER:

"Movement of walleye and sauger in the upper Mississippi River," by Roger Schoumacker, article, *Transactions of the American Fisheries Society*, vol. 94, no. 3, 1965, pp. 270-271, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

NORWAY:

"Forsøksfiske etter blåkveite utenfor Lofoten og Helgeland" (Exploratory fishing for Greenland halibut off Lofoten and Helgeland), by O. Chr. Jenssen, article, *Fiskets Gang*, vol. 51, no. 39, Sept. 30, 1965, pp. 584-585, illus., printed. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway.

Articles from *Fiskets Gang*, vol. 51, 1965, printed in Norwegian. Fiskets Gang, Fiskeridirektoratet, Radstuplass 10, Bergen, Norway:

"Fiskeflåten 1963 og 1964" (Fishing Fleet, 1963 and 1964), no. 41, Oct. 14, 1965, pp. 609-613.

"Tokt med G. O. Sars til Nord-Norge, 22 Juli-14 August 1965" (G. O. Sars cruise to North Norway, July 21 to August 14, 1965), by Finn Devold, no. 41, Oct. 14, 1965, pp. 614-616, illus. Purpose of cruise was to learn more about distribution of herring and oceanographic materials.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"Fiskeforsøk etter sjøkreps 1964" (Exploratory fishing for Norway lobsters 1964), by Birger Rasmussen, no. 42, Oct. 14, 1965, pp. 629-631, illus. Pertains to *Nephrops norvegicus*, also known as scampi and Dublin prawn.

Articles from *Norsk Fiskerinaering*, vol. 5, no. 3, 1965, printed in Norwegian. Norsk Fiskerinaering, Maltrostveien 16B, Oslo, Norway:

"Sentralisert eller fri eksport av fisk og fiskevarer?" (Centralized or free export of fish and fish commodities?), pp. 35, 37, 39, 41-42.

"Foran en forhøpentlig lysere tid i fiskerinaeringen haster det med a fa en hensiktsmessig skatteordning!" (Before a hoped for brighter time in the fishery business we must hasten to acquire an appropriate tax adjustment!), pp. 45, 47.

"Utviklingen pa arbeidsmarkedet i arene 1956 til 1964" (Development in the labor market in the years 1956 to 1964), pp. 61, 63.

OCEANOGRAPHY:

Deep-Sea Research, vol. 12, no. 1, Feb. 1965, 114 pp., illus., printed. Pergamon Press Ltd., 122 E. 55th St., New York, N. Y. 10022. Two of the articles are: "Synthetic-fiber deep-sea mooring cables: Their life expectancy and susceptibility to biological attack," by P. B. Stimson; and "A mass fish mortality on the Somali Coast," by P. Foxton.

Instrumented Telemetering Deep Sea Buoys, by H. W. Straub and others, Technical Bulletin No. 26, 26 pp., printed, June 1965, 25 cents. Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

New Worlds of Oceanography (Man's New Explorations into the Mysterious, Living Sea), by Captain E. John Long, USNR (ret.), preface by Senator Warren G. Magnuson, 221 pp., illus., printed, 1965, \$0.75. Pyramid Publications, Inc., 444 Madison Ave., New York, N. Y. 10022. Man knows more about space than he does about the sea, but in order to increase man's knowledge of the ocean depths, more and more books are being issued. A summary of man's knowledge of the sea and a fascinating exploration into tomorrow's knowledge of the wealth of the sea is contained in this little book. It documents America's billion-dollar development of the ocean's treasure and its limitless supply of natural resources in the years to come. It points out how a cubic mile of sea water containing 18 million tons of magnesium and 25 tons of gold can be mined; the existence of a new deep underwater treasure worth countless billions of dollars; how enough drinking water from the sea can be desalted to serve the needs of every person in the world a thousand times over; and the use of "oceanic engineering" to obtain more of the fishery resources of the sea. The chapters deal with the realm of "living fossils"; man and the sea; currents, waves; and the like; the living waters--fishes and mammals; the bottom--and lower; most precious mineral--and others; poisoning the sea; birthplace of storms; making fisheries pay; gadgets and hardware; oceanic defense problems;

and a glimpse into the future. Senator Magnuson in his preface states: "... This is where Captain Long's book has particular value. His Chapter headings... should stimulate many to greater interest in the oceans." The book is adequately indexed.

--Joseph Pileggi

Oceanographic Observations in the Indian Ocean in 1963, H. M. A. S. GASCOYNE (Cruise G1/63), Oceanographical Cruise Report No. 21, 136 pp., illus., processed, 1965. Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization, Melbourne, Australia.

Ocean Science and Ocean Engineering, 1965, vol. 1, pp. 1-656 + xiv; and vol. 2, pp. 657-1349 + xiv; illus., printed, 1965, \$4.00 each. Marine Technology Society, Executive Building No. 828, Washington, D. C. 20005. These two volumes contain papers presented at the Ocean Science and Ocean Engineering Conference held under the joint sponsorship of the Marine Technology Society and the American Society of Limnology and Oceanography, in Washington, D. C., June 14-17, 1965. Their purpose is to disseminate knowledge of the marine sciences to the membership of sponsoring societies and to the scientific community at large. Papers of each conference session are grouped together and are arranged in the chronological order of the several conference sessions. A new order of cooperation between government (both national and state), industry, science, and labor will be required if the oceans of the world are to be understood and intelligently used for the benefit of mankind. The world has been working for the past few years on a concentrated program in oceanography to study the dynamics of ocean behavior on and beneath the surface, to map the depths and shorelines with much greater accuracy and to assess the vast storehouse of food, minerals, and chemicals for future exploitation by mankind. The papers range from "Petroleum's Pandora" to "The Vertical Distribution of Phytoplankton in Tropical Waters." A few of the papers of particular interest to fisheries include: "Ocean Engineering and Oceanography--From the Businessman's Viewpoint"; "Ocean Engineering--Its Application to the Harvest of Living Resources"; "A Submarine for Research in Fisheries and Oceanography"; "An Improved Depth Telemetry System for Fishing Gear Experiments"; "An Unmanned Research Vehicle for Use Down to Mid-Ocean Depths"; "Oceanic Information--Its Collection and Dissemination." The numerous papers cover a wide gamut of interest and serve to review the present status of ocean science and engineering.

Ocean Sciences, edited by E. John Long, 302 pp., illus., printed, 1964, \$10. United States Naval Institute, Annapolis, Md. The sea and man's centuries of work and warfare on it have resulted in many books, but it is only in recent years that books on the resources of the sea have been issued. One of the most promising ways of meeting the needs of our exploding world population is to extend our range to include the three-quarters of the earth which is covered by water, and tap the riches which lie in and under it. Here is a round-table discussion of the highly individual but closely related sciences which contribute to the overall knowledge of the oceans, their physical properties,

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and how to utilize them. This book fills the gap between popular literature and technical writing on the subject of oceanography. The book is a series of articles by scientists and naval officers discussing in nontechnical language the major disciplines and fields of interest of oceanography today. Chapters cover the history of oceanography, physical properties, military oceanography, meteorology and climatology, charts and maps, polar oceanography, marine biology, atomic and other wastes in the sea, instrumentation and underwater vehicles, marine geology, National Academy of Sciences-National Research Council Committee on Oceanography, oceanography and government, fisheries and oceanography, and oceanography's future. A desirable feature are the appendices which list and describe the oceanographic research institutions around the world; present data on oceanographic ships of the world by institute and country; and include some conversion tables. Also included is a glossary of oceanographic terms, a bibliography, and an index. This will be a valuable addition to any fishery or marine library, and a desirable desk reference for the marine scientist. The layman will find many tidbits of information about our watery world.

--Joseph Pileggi

Processing Oceanographic Station Data Using Rapid Data-Handling Equipment, TM No. 284, 40 pp., illus., processed, August 1962. U. S. Naval Underwater Ordnance Station, Newport, R. I.

Serial Atlas of the Marine Environment--Inorganic Nutrients in the North Sea, by Robert Johnston and Peter G. W. Jones, Folio 11, illus., printed, 1965, looseleaf \$4.50, bound \$7.50. Serial Atlas of the Marine Environment, American Geographical Society, Broadway at 156th St., New York, N. Y. 10032.

PAKISTAN:

Establishing a Business in Pakistan, by Larry A. Nicksch, OBR 65-72, 13 pp., printed, October 1965, 15 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A report summarizing the major legal requirements for establishing a business and investing in Pakistan. It outlines the pertinent sections of Pakistan's laws, regulations, and policies affecting the establishment and operation of business enterprises in Pakistan by foreign nationals. Attention also has been given to the factors governing foreign participation in joint ventures with Pakistan nationals.

PEARLS:

"Pearl expert sees rich future for Pacific's 'white gold'," article, Pacific Islands Monthly, vol. 36, no. 9, Sept. 1965, p. 61, illus., printed, single copy 60 U. S. cents. Pacific Publications Pty. Ltd., 29 Alberta St. (Box 3408, G.P.O.), Sydney, Australia. Refers to the cultured pearl industry.

POISONOUS FISH:

Poisoning by Barracuda and Other Fishes, by Donald De Sylva, Special Service Bulletin No. 13, 8 pp., Aug. 1956, printed. The Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami Fla. 33149.

POLAND:

Faculty of Fisheries, Agricultural University of Warmia and Mazury in Olsztyn, 19 pp., printed, 1965. Wydział Rybacki, Warmińsko-Mazurskie Akademii Rolnicze (The Faculty of Fisheries, Agricultural University of Warmia and Mazury), Olsztyn, Poland. A prospectus of the Faculty of Fisheries which outlines in detail its educational and research aims in the study of oceanography, marine biology, limnology, ichthyology, and fish culture. It also describes the Faculty's work on technology of fish processing, fishery microbiology, and fishery economics.

POND FISH:

"Demand growing for pond-raised commercially-fed fish says biologist," article, Feedstuffs, vol. 37, Mar. 13, 1965, p. 8, printed. Miller Publishing Co., 2501 Wayzata Blvd., Minneapolis, Minn.

PUERTO RICO:

Institute of Marine Biology, University of Puerto Rico, Contributions, vol. 4, Oct. 1962-Dec. 1963, 64 reprints of articles, printed. Institute of Marine Biology, University of Puerto Rico, Mayaguez, Puerto Rico. Some of the reprints are: "Methods of collecting small fishes," by John E. Randall, contribution no. 45 (reprinted from Underwater Naturalist, vol. 1, no. 2, Feb. 1963, pp. 6-11, 32-36); "Institute of Marine Biology, University of Puerto Rico," by John E. Randall, contribution no. 57 (reprinted from American Zoologist, vol. 3, no. 3, Aug. 1963, pp. 303-304); "Dangerous sharks of the Western Atlantic," by John E. Randall, contribution no. 62, (reprinted from Sharks and Survival, chapter 11, pp. 339-361, 1963); "Report of the West African Fisheries Survey. . . Gulf of Guinea," by Gilbert W. Bane, Jr., contribution no. 64, (reprinted from Starkist Foods, Inc. Special Report, Aug. 1960, 63 pp.).

RED SEA:

"A Review of the Elopoid and Clupeoid Fishes of the Red Sea and Adjacent Regions," by P. J. P. Whitehead, Bulletin of the British Museum of Zoology, vol. 12, no. 7, 1965, 57 pp., illus., printed, 19s. (about US\$2.70). British Museum (Natural History), Cromwell Rd., London SW7, England.

RESOURCE MANAGEMENT:

The Fisheries Problems in Resource Management, edited by James A. Crutchfield, 152 pp., illus., printed, 1965, \$5.00. University of Washington Press, Seattle, Wash. 98105. The first volume of studies on Public Policy Issues in Resource Management based on a series of seminars sponsored by the Graduate School of Public Affairs of the University of Washington. With the increasing interest in the resources of the seas, the question of the proper management of those resources becomes important. All of the key issues of natural resources public policy are found in the fisheries resource: the concept of the public interest, including both economic and social values; the conservation issue; the question of technical expertise versus lay judgment; the problem of competing governmental jurisdictions. The interdisciplinary approach in dealing with such problems is brought out in the three parts that make up this book. The physical setting of the fishing industry and the complex dynamics of the regulation of fishery populations are covered in "Part I: Conservation of the Resource." The relation of the economic motiva-

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tions of the commercial fisheries to the physical characteristics, and the resulting administrative problems are examined in "Part II: Economics and Administration." The various objectives and techniques of fishery conservation from the point of view of constitutional and international law are brought out in "Part III: Fishery Law." The whole presentation is a series of papers and commentary on public policy issues involved in the management of fishery resources and presented at the inaugural series of Natural Resources Public Policy Seminar sponsored by the Graduate School of Public Affairs. Selected references are included. This book should be of value to administrators and social scientists, commercial and sport fishermen, dealers in fishery products, biologists, consultants, researchers, and others interested in the resources of the seas.

--Joseph Pileggi

SALMON:

Atlantic Salmon Journal, Fall 1965, 38 pp., illus., printed, Atlantic Salmon Association, 1559 McGreggor St., Montreal 25, Canada. Contains, among others, articles on: "Salmon and sea trout hybrids," by D. J. Piggins; "Quebec's research on a new type of fishway for salmon"; "The survival of Pacific Salmon in the Atlantic"; "The Greenland salmon fishery"; "Preliminary report on recaptures in Greenland waters of salmon tagged in rivers of America and Europe," by Paul M. Hansen; "The Sea and Salmo salar," by T. B. Fraser; "Canadian Atlantic salmon recaptured near Greenland"; and "Greenland fishing of Atlantic salmon."

Salmon of the North Pacific Ocean, Part V, Offshore Distribution of Salmon, by J. I. Manzer and others, Bulletin No. 14, 455 pp., illus., printed, 1965. International North Pacific Fisheries Commission, 6640 NW. Marine Dr., Vancouver 8, B. C., Canada. A description of the offshore distribution of salmon as determined from information obtained from research vessel operations and records of commercial fishing vessels.

Articles from Pacific Marine Fisheries Commission Bulletin, No. 6, 1963, printed. Pacific Marine Fisheries Commission, 741 State Office Bldg., 1400 S.W. 5th Ave., Portland 1, Oreg.:

"Availability of small salmon off the Columbia River," by H. Heyamoto, pp. 81-88.

"Statistical methods for estimating California salmon landings," by Norman J. Abramson and Paul T. Jensen, pp. 61-2.

SARDINES:

"O fabrico das conservas de sardinha do Mediterraneo em Tunes" (Canning of Mediterranean sardines in Tunisia), article, Conservas de Peixe, vol. 20, no. 234, September 1965, pp. 15, 17, 19-20, 32, printed in Portuguese. Sociedade da Revista Conservas de Peixe, Lda., Requeirao dos Anjos, 68, Lisbon, Portugal.

SEAWEED:

"Estudios sobre algas realizados en las costas españolas" (Studies on seaweeds from the Spanish

coasts), by Manuel Lopez Benito, article, Industria Conservera, vol. 31, no. 312, June 1965, pp. 157-158, illus., printed in Spanish. Industria Conservera, Calle Marques de Valladarea, 41, Vigo, Spain.

SHARKS:

About Sharks and Shark Attack, by David H. Davies, 237 pp., illus., printed, 1964. Shuter & Shooter, Pietermaritzburg, Natal, South Africa Republic.

Sharks and Survival, edited by Perry W. Gilbert, 582 pp., illus., printed, 1963, \$9.95. D. C. Heath & Co., 285 Columbus Ave., Boston 16, Mass. "Man eaters" and sharks are synonymous to many people. Some of the larger and more active species have earned this reputation. But of 250 species of sharks widely distributed throughout the oceans of the world, only a few are dangerous to man. The great majority either are so small, so sluggish, and so weakly armed, or normally feed on such small prey that they are no menace to man. Yet those few that are dangerous to man have created a real hazard to men of the sea. There are a number of species that are a menace to man in amphibious operations, under conditions of emergency survival at sea, to divers, or to bathers on the beaches. Although there have been extensive studies on the sharks of the western North Atlantic, there are still wide gaps in our knowledge on their distribution, seasonal migrations, feeding habits, physiology of even the better known species, and the relationships between the species. This book concentrates on the known habits and regional distribution of the sharks that are known to be especially dangerous in different parts of the world, but it also reviews the sensory equipment of sharks that influences and directs their predatory activities. A substantial portion of the book is devoted to the shark-hazard problem and to a review of the various precautions man may take to increase his chances of survival in shark-infested waters. The book is an outgrowth of a Conference on the Basic Research Approaches to the Development of Shark Repellents, sponsored by the AIBS and Tulane University and supported by the Office of Naval Research and the Navy Bureau of Aeronautics. Consisting of six sections, the book is made up of chapters by contributors who are experts in their field. Section I on taxonomy and distribution is a guide to the kinds of potentially dangerous sharks. Section II on behavior of sharks presents field notes and field observations, sharks in captivity, and facilities for experimental investigation of sharks. Section III on the nervous system and sense organs of sharks discusses the central nervous system, hearing, olfaction, gustation, and visual apparatus. Section IV concentrates on dangerous sharks and devotes chapters to shark attacks in Australia, dangerous species of the Western Atlantic, shark attacks in South African seas, and open-ocean shark attacks. Section V presents patterns of shark attack for the world. Section VI concentrates on the shark-hazard problem and therefore chapters on attacks by sharks as related to the activities of man; specifications for a shark repellent; development of the U. S. Navy "Shark Chaser" chemical shark repellent; anti-shark measures; testing shark repellents; first-aid treatment of shark bites; advice to those who frequent or find themselves in shark-infested waters; and the AIBS shark research panel. The appendix is a most complete resume of

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shark attacks ever assembled, together with an analysis of environmental factors that may provoke sharks to attack man. Besides a good general index, the book has an index to scientific names of sharks. This book will answer many questions about sharks and will be of interest to researchers, fishermen, vessel owners, and all those interested in the sea.

--Joseph Pileggi

SHELLFISH:

National Shellfish Sanitation Program Manual of Operations, Part II--Sanitation of the Harvesting and Processing of Shellfish, Public Health Service Publication No. 33, 62 pp., illus., processed, 1965 revision, 55 cents. Public Health Service, U. S. Department of Health, Education, and Welfare, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

SHRIMP:

"On the introduction of an edible oriental shrimp (Caridea, Palaemonidae) to San Francisco Bay," by W. A. Newman, article, Crustaceana, vol. 5, no. 2, 1963, pp. 119-132, printed. Florida Board of Conservation, Marine Laboratory, St. Petersburg, Fla.

"Prawn resources of Southern Maharashtra (Ratnagiri)--an outlook for a new industry," by M. R. Ranade and S. M. Wankar, article, Current Affairs Bulletin, no. 43, August 1965, pp. 6-10, processed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand. A brief review of the origin and growth of the shrimp fishery of Southern Maharashtra, together with some observations on the catches as a result of the exploratory survey. Discusses the potential as a fishery.

"Shrimp nursery--Science explores new ways to farm the sea," by Clarence P. Idyll, article, National Geographic, vol. 127, no. 5, May 1965, pp. 636-659, illus., printed. National Geographic Society, 17th and M Sts. NW., Washington, D. C. 20036.

SMALL BUSINESS:

A Survey of Federal Government Publications of Interest to Small Business--2nd Edition, compiled by Elizabeth G. Janezeck, 126 pp., printed, 1965, 45 cents. Small Business Administration, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

SMOKING:

Controlled Smoking of Hake, by G. M. Dreosti and A. Empedocles, Progress Report No. 84, 3 pp., processed, July 1965. Fishing Industry Research Institute, University of Cape Town, Rondebosch, Cape Province, South Africa Republic.

SOUNDS IN THE SEA:

Review of Marine Bio-Acoustics (State of the Art: 1964), AD 619 283N, by William N. Tavolga, 55 pp., illus., photostat, February 1965, \$4. Clearinghouse for Federal Scientific and Technical Information, Springfield, Va. 22151. The available information and literature on marine animal sounds is surveyed, reviewed, and evaluated. A brief historical review

lists some of the major contributions to the field from the early 19th century to date, and a general non-technical survey covers the contribution of marine animals to ambient sea noise and the sounds of marine invertebrates, fishes, and cetaceans. A detailed technical review summarizes and evaluates the literature on: mechanisms of sound production in marine animals, including a discussion on the physics of swim bladders as acoustic transducers; the acoustical characteristics of marine animal sounds; auditory capacities of marine animals; and the biological and behavioral significance of marine animal sounds. The problems of identification and classification of unknown sound sources are discussed. Examples of sonic mechanisms and spectrograms of the sounds are illustrated.

SOUTH AFRICA:

S. A.'s Sea Wealth (Cape Times Annual Review of the Fishing Industry), by Clive Algar, 20 pp., illus., printed, Oct. 28, 1965. Central News Agency Limited, 130 Bree St., Cape Town, South Africa Republic. (Available from The Cape Times Limited, Burg St., Cape Town, South Africa Republic.) Articles included are: "Anchovies help inshore fishing"; "Shrimp and prawn possibilities"; "Cape catches 1,500 whales"; "Boost to rock lobster industry"; "S. A. fish meal is world's choice"; "R5m. spent on new trawlers"; "SWA's big share of shoal catch"; "Plans for harbour development"; "Big-game fishing is popular"; and "All pilchard boats built locally."

SPAIN:

Export Market Guide to Spain, 4 pp., printed, 1965, 10 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C., 20230.

"Técnica conservera--sardina diagrama del proceso del recorrido S-5" (Canning technique--sardine flow-chart S-5), article, Industria Conservera, vol. 31, no. 312, June 1965, pp. 160-161, printed in Spanish. Industria Conservera, Calle Marques del Valladarea, 41, Vigo, Spain.

SPINY LOBSTER:

"Economy of Western Australian crayfishery--prosperity depends on U. S. A. market," by D. J. Barker and T. H. McClelland, article, Australian Fisheries Newsletter, vol. 24, no. 11, November 1965, pp. 24-26, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, Australia.

Articles from Boletín de Estudios de Pesca, vol. 3, 1963, illus., printed. Boletín de Estudios de Pesca, Rio de Janeiro, Brazil:

"Contribuição ao estudo sobre as variações de produtividade das pescarias de lagosta na costa oriental do nordeste Brasileiro e flutuações na composição dos desembarques na praia do Pina (Pe)" (Studies of the variation in productivity of the spiny lobster fisheries of the east coast of Northeast Brazil and fluctuations in the composition of landings on Pina beach--Pernambuco), by Soloncy J. C. de Moura, no. 9/10, pp. 7-19.

"Variações sazonais na composição biológica dos desembarques de lagostas" (Seasonal variation in the biological composition of the landings of spiny lobsters), by Petrólio Alves Coelho, no. 11/12, pp. 21-32.

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SQUID:

The Structure, Development, Food Relations, Reproduction, and Life History of the Squid LOLIGO OPALESCENS Berry, by W. Gordon Fields, Fish Bulletin 131, 108 pp., illus., printed, 1965. Department of Fish and Game, The Resources Agency, Sacramento, Calif. 95814. (Sold by Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.)

STRIPED BASS:

"Migrations of the Atlantic striped bass," by John R. Clark, Michael Westerfield, and Herbert Austin, article, Underwater Naturalist, vol. 2, no. 2, 1964, pp. 5-6, printed. American Littoral Society, Sandy Hook Marine Laboratory, Highlands, N. J.

SWEDEN:

"Forutsagelser rörande skarpsillforekomsten på Väst-kusten" (Predictions concerning occurrence of sprat on the west coast), by Armin Lindquist, article, Svenska Västskustfiskaren, vol. 35, no. 18, September 25, 1965, pp. 322-323, printed in Swedish. Svenska Västskustfiskarnas Centralförbund, Ekonomiutskottet Postbox 1014, Göteborg 4, Sweden.

TARIFFS:

Tariff Schedules of the United States, Annotated, 1965, TC Publication 163, 653 pp., printed, \$6; plus \$1.50 for foreign mailing. United States Tariff Commission, Washington, D. C., November 4, 1965. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) This volume supersedes the Tariff Schedules of the United States Annotated (1963). It contains the legal text of the Tariff Schedules of the United States, as amended and modified, together with annotations prescribing statistical information to be supplied on customs entry and withdrawal forms with respect to articles imported into the customs territory of the United States. It is designed to enable importers, customs brokers, customs officers and other interested persons to determine (1) the rates of duty applicable to imported articles (includes fishery products), and (2) the requirements for reporting statistical data with respect to such imports. Also includes amendments and modifications made on or after August 31, 1963, and before October 22, 1965.

TARIFF AND TRADE:

Operation of the Trade Agreements Program, 16th Report, July 1963-June 1964, TC Publication 164, 146 pp., processed, 1965. United States Tariff Commission, Washington, D. C. 20436. This report covers events from July 1963 to June 1964. It describes U. S. preparations for participation in the sixth round of multilateral trade agreement negotiations (known as "the Kennedy round") and the status of negotiations at the close of the period. The 21st Session of the Contracting Parties to the General Agreement was held in the spring of 1964. GATT activities of interest to the less-developed countries were among the major topics explored at the session. The Commission's report describes these and other major developments respecting the trade agreements program.

TERRITORIAL WATERS:

An Act, To prohibit fishing in the territorial waters of the United States and in certain other areas by

vessels other than vessels of the United States and by persons in charge of such vessels), by Kenji Itano, No. 9, 38 pp., printed in Japanese. Japan Fisheries Conservation Association, Zenkoku Choson Kaikan Bldg., 1-17, Nagata-Cho, Ciyoda-ku, Tokyo, Japan.

THAILAND:

An Analysis of Demersal Catches Taken from the Experimental Trawling Operations in the Gulf of Thailand, by Sanan Ruamranga and Andhi P. Isarankura, Contribution No. 3, 72 pp., illus., printed in English, May 1965. Department of Fisheries, Bangkok, Thailand. Main objectives of this analysis were to study catch per unit of effort for demersal fish in relation to the depth of water by area as well as by season; catch composition by species of economical value in relation to the depth of water and to area; and catch ratios of species of economical value to other fish in relation to the depth of water. The analysis also compares the night and day catches; morning and afternoon catches; and presents a tabulation of structures of the sea bottom in various locations throughout the Gulf, including an indication of the places where grounds were found to be unsuitable for trawl fishing.

Export Market Guide to Thailand, 10 pp., printed, 1965, 10 cents. Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. 20230.

TRADE LISTS:

The U. S. Department of Commerce has published the following mimeographed trade lists. Copies may be purchased by firms in the United States from the Commercial Intelligence Division, Office of International Trade Promotion, Bureau of International Commerce, U. S. Department of Commerce, Washington, D. C. 20230, or from Department of Commerce field offices at \$1 a copy:

Oils (Animal, Fish and Vegetable)--Importers, Dealers, Producers, Refiners and Exporters--Spain, 23 pp., September 1965. Lists names and addresses, size of firms, and types of product (including fish oil) handled by each firm. Also contains trade and industry data (including fish oil).

Canneries and Frozen Foods--Producers and Exporters--Honduras, 4 pp., September 1965. Lists names and addresses, size of firms, and types of products (including fish and shellfish) handled by each firm. Also contains trade and industry data (including fishery products) on production, exports, imports, and export control of canned and frozen foods.

Canneries and Frozen Foods--Producers and Exporters--Hong Kong, 8 pp., October 1965. Lists names and addresses, size of firms, and types of products (including fish and shellfish) handled by each firm. Also contains trade and industry data on production and exports of canned and frozen fish and shellfish.

TRAWLERS:

"Essais d'un nouveau type de chalut équipé d'un dispositif de sélectivité pour la pêche des crevettes," (New type of selective trawl tested for the shrimp fishery), by G. Kurc, L. Faure, and T. Laurent, article, La Pêche Maritime, vol. 44, no. 1051, October 1965, pp. 754-757, illus., printed in French, single copy 15 F. (US\$2.85). La Pêche Maritime, 190 Boulevard Haussman, Paris 8e, France.

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TRAWLING:

Articles from Current Affairs Bulletin, no. 43, August 1965, processed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Bangkok, Thailand:

"Coastal trawling for prawns and fish," by A. C. J. Weerekoorn, pp. 4-5. Some results of recent trials carried out in Ceylon on trawling.

"Trawling in tropical waters (India)," by K. Chidambaram, pp. 1-3. An account of the trials in Indian coastal waters with trawling from small craft. Discusses research to develop suitable types of gear and presents some catch data.

TUNA:

"Conteúdo estomacal e evolução sexual dos atuns e espécies affins" (Stomach contents and sexual development of tunas and related species), by José Bon G. Fonseca and Silvio B. Maraes, article, Boletín de Estudios de Pesca, vol. 3, no. 9/10, 1963, pp. 3-6, illus., printed. Boletín de Estudios de Pesca, Rio de Janeiro, Brazil.

Ecology and Dynamics of the Skipjack Population, by Tsuyoshi Kawasaki, No. 8, Parts I and II, 108 pp., illus., printed in Japanese. Japan Fisheries Conservation Association, Zenkoku Choson Kaikan, Bldg., 1-17, Nagata-Cho, Ciyoda-ku, Tokyo, Japan.

"Food and feeding habits of skipjack tuna (Katsuwonus pelamis) from the Marquesas and Tuamotu Islands," by Eugene L. Nakamura, article, Transactions of the American Fisheries Society, vol. 94, no. 3, 1965, pp. 236-242, printed. American Fisheries Society, 1404 New York Ave. NW., Washington, D. C. 20005.

UNDERWATER EXPLORATION:

Something Rich and Strange, by Robert E. Schroeder, 191 pp., plus 32 pp. of photographs (some in color), printed, 1965, \$5.50. Harper & Row, Publishers, Inc., 49 East 33rd St., New York 16, N. Y. While seated in your favorite armchair, you can join a marine biologist, who is also a skin-diving enthusiast, in exploring the marvelous life of the sea at night. The remarkable changes between day and night in the waters around coral reefs are revealed in this book. In direct and simple style the author paints word pictures of day and nighttime marine creatures feeding, fighting, and reproducing. Bovine parrotfish crunch coral to obtain algae; shrimp swim in and out of the mouths of predatory fish to remove tiny parasites; spidery arrow crabs fish for worms with long ice-blue claws. Fish-watching and the author's day-to-day adventures in the Caribbean are described vividly. Consisting of two parts, Part I deals with the Virgin Islands and includes these chapters: St. John; Salt Pond Bay; Love Life of the Redfin; Diadema (spiny black urchin of the coral reefs) and Other Monsters; Cosmos of the Lantern; Buck Island; and Of Birds and Jellies. Part II deals with the Florida Keys and includes these chapters: Alligator Reef; Night Creatures of Alligator Reef; Little People of the Reefs; Those Worms in Fish; The Deep Reefs; Matecumbe; Beyond the Reefs. The author also describes the opportunity underwater research offers to man in understanding the underwater environment, and in mining its resources. Scientifically sound and informative,

this book should be of interest to all those who would like to learn more about the mysterious world under the sea. The book has a good index.

--Joseph Pileggi

U.S.S.R.:

Articles from Rybnoe Khoziaistvo, No. 8, August 1965, printed in Russian, single copy 50 Kopecks (about 56 U. S. cents). Rybnoe Khoziaistvo, V. Krasnosel'skaia 17, Moscow B-140, U. S. S. R.: "New progressive methods in fisheries," pp. 1-3; "The sword-fish," by V. V. Ovchinnikov, pp. 8-11; "Fishery resources of the continental shelf of the Northern Pacific Ocean," by N. P. Novikov, pp. 11-16; "Squids--a potential resource," by G. V. Zuev, pp. 16-19; "The method of control of mixed diseases of carp yearlings," by A. M. Aligadzhiev, pp. 30-36; "Continued development of fisheries on the high-seas and oceans," by N. M. Saburenkov, pp. 34-36; "A new method of search in commercial exploratory fishing," by A. A. Degtiarev, pp. 36-39; "Electric light fishing for hering and sardines," by I. I. Bagautdinov, pp. 41-44; "Let us pay more attention to the shore-based fishery for marine mammals," by Iu. I. Nazarenko, pp. 49-50; "Efficient utilization of the Pacific halibut," by A. A. Kirillova and P. L. Kantemirova, pp. 53-55; "Commercial and chemical characteristics of the Atlantic scup and its utilization," by V. P. Alexandrovskiy and others, pp. 55-58; "High temperature and multi-stage sterilization of canned fish," by M. S. Aminov and L. I. Skorokhodova, pp. 58-62; "Analysis of the productivity of refrigerated fish carriers," by Iu. L. Korotkov, pp. 72-76; "Determining the net cost of the fishery production must be improved," by I. Anukhin, pp. 76-78; "Methods of determining the standards for simultaneous unloading of fishing boats and the traffic capacity of a fishing port," by A. V. Sorokin, pp. 78-80; "Plant distribution problems in the Caspian fish-processing industry," by V. K. Kiselev, pp. 80-82; "Model vessels of the Azov and Black Sea fishing industry," by N. Ziuz'ko and V. Boichenko, pp. 82084; "Present trends in the world production of fish meal," by V. M. Shparlinskii, pp. 84-87; "Defrosting of fish in moist air current (Survey of foreign sources)," by V. P. Bykov, pp. 89-91; and "The development of marine fishing in Poland," by Menrikh Tetslaf, pp. 91-93.

Research Vessels of Academy of Sciences, USSR, by Ye. M. Suzyumov, Technical Translation No. 65-32342, 21 pp., illus., printed, September 2, 1965, \$1.00 (Translated from the Russian, Vestnik Akademii Nauk SSSR, no. 7, July 1963.) Clearinghouse for Federal Scientific and Technical Information U. S. Department of Commerce, Port Royal and Braddock Roads, Springfield, Va. 22151.

UNITED KINGDOM:

"British fisheries changing fast," by H. G. Garland, article, Foreign Trade, vol. 124, no. 9, October 30, 1965, pp. 14-15, illus., printed, 25 Canadian cents. Department of Trade and Commerce, Ottawa. (Sold by Queen's Printer, Government Printing Bureau, Ottawa, Canada.) Reviews changes and experiments in the catching, processing, storage, and marketing of fish in Great Britain.

VESSELS:

"Islands norskbygde havfiskefartoy topper fangststatistikken" (Iceland's Norwegian-built sea fishing

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

boats top the catch statistics), by Mats Wibe Lund, Jr., article, Norges Handels og Sjøfartstidende, March 1965, illus., printed. Norges Handels og Sjøfartstidende, Kogensgate 6, Oslo, Norway.

VITAMINS:

"Content of vitamin A in Liver and intestines of fish from the Bering Sea, and methods for the procurement of raw materials for the manufacture of vitamin A," by G. A. Dolbish, article, Chemical Abstracts, vol. 63, Aug. 16, 1965, Abstract No. 4093g, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

WHALES:

Whale's Way, by Johanna Johnston, illustrated by Leonard Weisgard, 45 pp., illus., printed, 1965, \$2.95. Doubleday & Company, Inc., 277 Park Avenue, New York, N. Y. 10017. Young readers up to six in this book will find an outline of a year in the

life of a humpback whale. They will learn that whales are not fish, but warm-blooded animals; although humpbacks are only medium-sized whales, each weighs five times as much as an elephant; whales' tails are called "flukes"; some whales have teeth and others do not; whales feed on plankton. The book traces a year in the life cycle of the whale--its long migrations to warmer seas, the birth and care of its young; and its play. Also, the distinguishing characteristics of the different types of whales are examined. Children naturally are interested in the sea and the creatures of the sea. To them the watery world is mysterious and conjures pictures of adventure and fantasy. This book will answer any child's questions about whales in simple language but with important details that are of interest as well as of educational value. The illustrations alone will arouse his interest and lead to questions.

--Joseph Pileggi



ALGAE PRODUCED FROM COMBINATION OF SALT WATER AND SEWAGE

A process for producing red algae continuously from a combination of salty water and sewage has been patented by two faculty members of the University of California.

The inventors of the process recommend a lagoon with hard bottom, in which the mixture of sewage and salty water can be contained for several days. Ocean water alone will not produce the algae, the scientists found. However, the addition of sewage or other nitrogen-containing chemicals makes the algae growth "highly successful." The scientists assigned patent rights to the Regents of the University of California. (Science News Letter, August 7, 1965.)

CORRECTIONS

Table 1 - Positions of Bureau of Commercial Fisheries - Atomic Energy Trawling Stations off the Columbia River, Oregon, which appeared on page 2 of the December 1965 issue, should be deleted--it does not pertain to the article, "A Japanese Gill-Net Fishery for Bottomfish in the Gulf of Alaska."

In the October 1965 issue, the article "Pasteurization of Fishery Products with Gamma Rays from a Cobalt-60 Source," page 5 - figure 2 cited in lines 27 and 38 should be figure 2; page 7 - figure 2 cited in lines 13 and 14 should be figure 4.

FISHERY EXPERTS STILL NEEDED FOR TECHNICAL ASSISTANCE IN MANY COUNTRIES

There are many FAO technical assistance projects in nearly all of the developing countries. The following is a December 1, 1965, list of vacancies for which FAO is recruiting. Write (on a confidential basis if desired) to: Roy I. Jackson, Director, Fisheries Division, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

The following list shows the country in which the vacancy exists, the types of fishery experts needed (in parentheses the duration of the assignment in months for the fiscal year 1965/66):

Aden: Biologist (24), 2 Masterfishermen (28 & 26).

Argentina: Marine Biologist (60), Oceanographer (42), 2 Trawl & Purse Seine Technologists (60 & 36), Acoustics Technologist (24), Economist (54).

Brazil: Fishery Training Expert (24), Planning and Statistics Expert (24), Policy and Institutions Expert (24).

Ceylon: Fishing Gear Technologist (12).

Congo (Brazzaville): Marine Resources Survey Project Manager (36).

Cuba: Fishing Gear Technologist (5).

Ghana: 3 Pelagic Biologists (53, 48, & 42), Demersal Biologist (46), Gear Technologist (48), Masterfisherman (54).

India: Fish Processing Technologist (6), Fishing Harbor Survey Project Manager (36).

Iran: Inland Fisheries Biologist (6).

Malaysia: Fishery Development Adviser (12).

Mexico: Fishery Development Adviser (12), Marketing Economist (12), Masterfisherman (18).

Nigeria: Masterfisherman (12), Fishing Gear Technologist (17), Lake Kainji Economic Dev. Project Manager (72).

Pakistan (East): Biologist (60), Fish Processing Technologist (36), Marketing Economist (48), Statistician (36), Marine Engineer (12).

Peru: Marine Resources Survey Project Manager (48).

Philippines: Fish Processing Technologist (24), 2 Marketing Economists (48), Naval Architect Technologist (30), Statistician (12), Masterfisherman (27).

Senegal: Fishing Gear Technologist (9), Marine Resources Survey Project Manager (60).

Sierra Leone: Marine Resources Survey Project Manager (60), Marine Biologist (12).

U.A.R.: Lake Nasser Economic Dev. Project Manager (60).

Uganda: (Lake Victoria): Limnologist (48), Statistician (24), Masterfisherman (36), Costing Economist (24).

Caribbean: 3 Masterfishermen (36).

Central Africa: Inland Fisheries Project Project Manager (60).

Central America: Marine Biologist (33), Economist (48), Masterfisherman/Fishing Gear (47), Technologist and Methods Expert (47), Technologist (48), 2 Fish Processing Technologists (30).



HIGHLIGHTS IN THIS ISSUE (FEBRUARY 1966)



Features

TRAWL COD END MESH SIZE SELECTIVITY TOWARD YELLOW PERCH IN LAKE ERIE--analysis of gear study for profitable catch rate (p. 1).

SKIPJACK TUNA (KATSUWONUS PELAMIS) RESOURCES OF THE TRUST TERRITORY OF THE PACIFIC ISLANDS--prewar catch rate used as index to potential fisheries (p. 6).

Trends in the United States Fisheries

ANCHOVY--California experimental fishery approved (p. 13).

FISHERIES LABORATORY--New tropical Atlantic laboratory at Miami, Fla. (p. 17).

FISH MEAL--When added to diet, swine grow faster (p. 21).

GEAR--Nekton ring net sampler for use aboard oceanographic research vessels--Equipment Note #18 (p. 9); trawl that sorts shrimp and fish to be tested (p. 13); pelagic gear research (p. 27).

MENHADEN--Review for 1965 (p. 23).

NAUTICAL CHARTS--Lists for Atlantic and Gulf coasts of United States (p. 25).

OCEANOGRAPHY--New Institute set up within U. S. Department of Commerce (p. 29); stable buoy, Sea Spider, installed off South Carolina (p. 31).

OREGON--Fish Commission changes fishing regulations (p. 32).

OYSTERS--Supplemental feeding tested (p. 34).

TUNA--Record size albacore caught (p. 39).

WASHINGTON--1963-1964 landings of fish and shellfish (p. 41).

Reports on Foreign Fisheries

BULGARIA--Trawlers to be built for domestic and Soviet fisheries (p. 52).

CANADA--Federal Government to assist fishermen for catch failures (p. 52).

EUROPEAN FREE TRADE ASSOCIATION--Reduces industrial tariffs another 10 percent (p. 46).

FRANCE--Holds International Conference on cod industry (p. 45).

JAPAN--Promotion launched on tuna canned in oil (p. 64); new tuna trolling gear developed (p. 65); views on fisheries agreement with South Korea (p. 69).

MAURITANIA--Spain to build fish-processing complex (p. 74).

TUNISIA--Swedish loans aid fisheries development (p. 82).

U.S.S.R.--Japan launches fifth in series of factoryships for Soviets (p. 84).

UNITED ARAB REPUBLIC--Soviet-Egyptian fishing agreement signed (p. 84).

Federal Actions Affecting Fisheries

DEPARTMENT OF COMMERCE--To aid Lake Superior commercial fishing industry (p. 87).

DEPARTMENT OF THE INTERIOR--Evaluating coating requirements for frozen raw breaded shrimp (p. 88).

Plus

Marketing and industrial products reports; State actions affecting fisheries; and reviews of recent fishery publications throughout the world.

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Fishes

COMMERCIAL FISHERIES REVIEW



VOL. 28, NO. 3

MARCH 1966

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington, D.C.



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
G. A. Albano and H. Beasley, Assistant Editors

Address correspondence and requests to the: Chief, Fishery Market News Service, U.S. Bureau of Commercial Fisheries, 1815 North Fort Myer Drive, Room 510, Arlington, Va. 22209.

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5/31/68

CONTENTS

COVER: The crew of the commercial surf clam vessel Gail Borden picking clams from a tow just dumped on deck. Many surf clam shells are dredged along with the live clams. The metal container is a measure used for picking the clams before dumping in burlap bags for stacking on deck.

Page		Page	
1	.. Ocean Clam Survey Off U. S. Middle Atlantic Coast--1963, by Phillip S. Parker		
10	.. Identification of Species in Raw Processed Fishery Products by Means of Cellulose Polyacetate Strip Electrophoresis, by J. Perry Lane, Wilma S. Hill, and Robert J. Learson		
Page	TRENDS AND DEVELOPMENTS:	Page	TRENDS AND DEVELOPMENTS (Contd.):
14	.. A Method of Forecasting the Relative Abundance of Northern Shrimp (<u>Pandalus borealis</u> Kr.) in Maine Waters, by R. L. Dow		Alaska Fisheries Explorations and Gear Development:
	Fishing Vessel and Gear Developments:	18	.. Shrimp Resources and Gear Efficiency Studies
16	.. Equipment Note No. 19--Trawl Cod-End Closing Device, by William W. High		California:
	Alaska:	19	.. Fall 1965 Pelagic Fish Population Survey
17	.. Foreign Fishing Activity off Alaska, December 1965	21	.. Survey of Shrimp Resources in Coastal Waters Continued
17	.. Sitka to have New Harbor	22	.. Abundance and Condition of Dungeness Crab Surveyed Prior to Open Season
18	.. Kodiak King Crab Fishery	22	.. Cans--Shipments for Fishery Products, January-November 1965
18	.. Vessel Taxation Change Proposed		Federal Purchases of Fishery Products:
	Alaska Fishery Investigations:	22	.. Department of Defense Purchases of Fresh and Frozen Fishery Products, November 1965
18	.. Food Habits and Behavior of Salmon Fry		
18	.. Red Salmon Fresh-Water Survival Rates Low in Karluk		

CONTENTS (CONTINUED)

Page		Page	
	TRENDS AND DEVELOPMENTS (Contd.):		FOREIGN (Contd.):
	Fur Seals:		International (Contd.):
23 ..	Interior Department Issues New Proposals for Improved Processing Techniques of Alaska Skins		International Whaling Commission:
	Great Lakes:	41 ..	Antarctic Whaling Operations, 1965/66
23 ..	Michigan Proposes Change in Yellow Perch Commercial Fishing Regulations	41 ..	Brazil to Withdraw from Commission
	Gulf Fishery Investigations:		Argentina:
24 ..	Shrimp Biology Program	41 ..	Fishing Industry Trends, 1964 and First Half of 1965
25 ..	Experimental Biology Program		Brazil:
	Industrial Fishery Products:	43 ..	Shrimp Shipped to United States from New Processing Firm
	U. S. Fish Meal and Solubles:	44 ..	Tuna Fishery Developments, 1965
26 ..	Production and Imports, January-November 1965		Bulgaria:
	U. S. Fish Meal, Oil, and Solubles:	45 ..	U. S. S. R. to Import Trawlers from Bulgaria
26 ..	Production, November 1965		Canada:
	New England:	45 ..	Tuna Cannery Being Built in New Brunswick
26 ..	Forecast of Groundfish and Sea Scallop Abundance in 1966 on New England Fishing Banks	45 ..	Groundfish Exports to Australia
	North Atlantic:	45 ..	Lobster-Splitting Machine Developed
27 ..	Soviet Fishing Activity off Coast, January 1966	46 ..	Lobsters Shipped to Denmark
	North Atlantic Fisheries Explorations and Gear Development:	46 ..	Government Increases Emergency Assistance to Fishermen for Catch Failure
28 ..	Surf Clam Survey Continued	46 ..	Insurance for Fish Traps and Shore Installations
31 ..	Tuna and Swordfish Explorations in Northwest Atlantic Continued	46 ..	Federal Department of Fisheries Sets up New Office to Administer Economic Aid
	Oregon:	46 ..	New Trade Commission Office Opened in Far East
32 ..	Willamette River Silver Salmon Count Resumed in 1965	46 ..	Firm Building Large Fish-Processing Plant at Mortier Bay, Newfoundland
	Salmon:		Communist China:
33 ..	Fish Food Contract Awarded	47 ..	Lobster Fishing in East China Sea
	South Carolina:		Cuba:
34 ..	Fisheries Biological Research Progress, October-December 1965	47 ..	Soviets Train Cuban Fishermen
	U. S. Foreign Trade:		Denmark:
35 ..	Airborne Imports of Fishery Products, January-September 1965	47 ..	Tuna Industry Trends
36 ..	Imports of Canned Tuna Under Quota	48 ..	Minimum Prices Set for Live and Iced Pond Trout Exports to Selected European Countries
	Virginia:	49 ..	Icing Regulations for Fish
36 ..	Marine Science Summer Training Program for High School Students	50 ..	Baltic Sea Lump sucker Rich Source of Roe for Caviar
	Washington:	50 ..	Frozen Product Labeling Requirements
36 ..	Evaluation of Cost and Production of Fish Farms	50 ..	Date Marking of Frozen Fishery Products
	Weather:	50 ..	Fish Processors Seek Imported Supplies
37 ..	New Radio Broadcast Network Established for Mariners	50 ..	Fishery Exports and Catch, 1965
	Wholesale Prices:	50 ..	Government Fishery Loans, Fiscal 1965
37 ..	Edible Fish and Shellfish, January 1966	51 ..	Fishing Vessel Loan Funds Nearly Exhausted
	FOREIGN	51 ..	Ex-Vessel Fish Prices, November 1965
	International:		East Germany:
	Fish Meal:	51 ..	Fishery Trends, Late 1965
39 ..	World Production, October 1965 with Comparisons		Ghana:
39 ..	Production and Exports for Selected Countries, January-November 1965	51 ..	Norway Delivers Last of Seven Stern Trawlers
	Food and Agriculture Organization:		Greece:
39 ..	New Fisheries Department Established Northeast Atlantic Fisheries Policing Conference:	52 ..	Fishery Trends, January-August 1965
40 ..	Second Session to Meet in London		Greenland:
	Salmon:	52 ..	Salmon Catch Declines in 1965
40 ..	Baltic Sea Conservation Agreement Between Denmark, Sweden, and West Germany Ratified	52 ..	Shrimp Fishery Trends in 1964 and Future Outlook
			Iceland:
		53 ..	Export Stocks of Principal Fishery Products, November 30, 1965
		53 ..	Exports of Fishery Products, January-October 1965
		53 ..	Fishery Catch and Trends, 1965
		54 ..	Fishery Landings by Principal Species, January-August 1965

CONTENTS (CONTINUED)

Page		Page	
	FOREIGN (Contd.):		FOREIGN (Contd.):
	Iceland (Contd.):		Pakistan:
54 ..	Utilization of Fishery Landings, January-August 1965	65 ..	Chinese to Include Fishery Products in Trade Fair
	Japan:		Persian Gulf:
54 ..	Canned Tuna Market Survey in West Germany	65 ..	Shrimp Fleet Built in Norway Arrives in Persian Gulf
55 ..	Tuna Canned in Brine Export Sales to U. S. Resumed		Peru:
55 ..	Albacore Tuna Ex-Vessel Price Trends, December 1965	65 ..	Liberalizes License Period for Foreign-Flag Fishing Vessels
55 ..	Albacore Tuna Export Quota to U. S. Increased		Philippines:
56 ..	Frozen Tuna Export Prices to Italy, December 1965	66 ..	Buy South African Canned Fish
56 ..	Company Increases Atlantic Ocean Tuna Purse-Seining Effort		Poland:
56 ..	Tuna Purse Seiner Reports Good Fishing in South Pacific	66 ..	Atlantic Tuna Fishery Not Planned
56 ..	Five Trawlers to Conduct Winter Operations in Gulf of Alaska	66 ..	Construction and Export of Fishing Vessels
57 ..	Fishing Plans for 1966 in Bering Sea-Gulf of Alaska		Rumania:
58 ..	Alaska Pollock for Fish Meal to be Bought from Soviets	67 ..	Discontinues Fishing in the Northwest Atlantic
58 ..	Government Announces Fish Meal Import Allocation		South Africa Republic:
58 ..	Mackerel Fishing Competition from Purse-Seiners Causes Problems for Pole-and-Line Fishermen	67 ..	Much of 1966 Fish Meal Output Sold in Advance for Higher Prices
59 ..	Mackerel Fishery off to Good Start		South-West Africa:
59 ..	Saury Catch Down in 1965	67 ..	White Fish Industry Expansion
59 ..	Whaling Operation in Newfoundland Under Study	67 ..	Vessel Owners Seek to Restrict Foreign Fishing Vessels
59 ..	Herring Roe Shortage Pushes Prices to Record High		Thailand:
59 ..	Rest Home for Fishermen to be Established at Las Palmas	68 ..	Japanese Set Up Joint Shrimp Enterprise in Thailand
60 ..	Japan-Communist China Private Fisheries Agreement Renewed		Tristan da Cunha:
60 ..	Fisheries Agency Budget for Fiscal Year 1966	68 ..	Tristan da Cunha Spiny Lobster Fishery, Late 1965
	Kenya:		Tunisia:
60 ..	Fisheries Production, 1964	68 ..	Yugoslavia to Construct Fishing Ports
	Republic of Korea:		U. S. S. R.:
61 ..	Tuna Fishing in Atlantic and Indian Oceans Planned from African Bases	69 ..	Pacific Ocean Perch Landings
	Morocco:	69 ..	Flounder Explorations in Bristol Bay
61 ..	Canners Complain About Export Controls	69 ..	Estonian Fishermen to Fish Off Iceland
	New Zealand:	69 ..	Poland to Build Soviet Oceanographic Research Vessels
62 ..	Japan Seeks Fishing Rights Within New Zealand 12-Mile Fishing Limit	69 ..	Fishery Aid to India
62 ..	Twelve-Mile Fishing Zone Claim Discussed With Japan	70 ..	Herring Sales to Scotland
	Nigeria:	70 ..	Antarctic Whaling Season, 1965/66
63 ..	Shrimp Fishery Trends, Late 1965	70 ..	Limit on Sealing Operations
	Norway:		United Kingdom:
63 ..	Exports of Fishery Products at Record Level in 1965	70 ..	Freezer-Trawler Fishery Trends, November 1965
63 ..	Ex-Vessel Prices for Industrial Fish in 1966	70 ..	Danish Pond Trout Promoted in Great Britain
64 ..	Canned Fish Export Trends, January 1-October 9, 1965, With Comparisons		Yugoslavia:
64 ..	Cost of Typical New Herring Purse Seiner	71 ..	Fishing Industry in Crisis
65 ..	Long-Line Baiting Machine Developed	71 ..	Increased Tuna Catches Planned
65 ..	Floating Plastic Fish Container Tested		FEDERAL ACTIONS:
			Department of the Interior:
			Fish and Wildlife Service:
			Bureau of Commercial Fisheries
			Applications for Fishing Vessel Loans
			Hearings on Applications for Fishing Vessel Construction Differential Subsidy
			Small Business Administration:
			Loan for Hake Reduction Plant in Aberdeen, Washington
			Eighty-Ninth Congress:
			Second Session
			First Session
			RECENT FISHERY PUBLICATIONS:
			Fish and Wildlife Service Publications
			Miscellaneous Publications



UNDERSEA MOUNTAINS DISCOVERED IN PACIFIC

The discovery of 12 undersea mountains north of the Hawaiian Islands, several of them towering almost 2.5 miles above the ocean floor, was reported May 21, 1965, by the Coast and Geodetic Survey, U. S. Department of Commerce. The massive elevations in the sea floor, termed seamounts by oceanographers, were covered by almost 1 to 2.5 miles of water.

The seamounts are probably of volcanic origin. They were located by C&GS ocean survey vessels in an area dotted with undersea mountains, between 250 and 1,000 miles north of the Hawaiian Islands.

One seamount, discovered by the vessel Surveyor, had a base which covered 18 miles in a North-South direction, with a crater 2 miles across and 900 feet deep. The crater's depth was considered unusual, because undersea mountain craters usually fill up. An oceanographer said this indicated the mountain was "comparatively young," geologically speaking. The seamount was 9,400 feet high, slightly less than the 9,700-foot mountain reported nearby earlier by the Surveyor.

The remaining seamounts were discovered by the vessel Pioneer. One rose 13,100 feet above the sea bottom, almost as high as Mt. Kennedy, the Canadian peak named for the late President. The seamount was discovered in an area where the ocean is more than 3.5 miles deep. The peak was covered by almost a mile of water.



The Pathfinder, one of the larger ocean survey vessels.

The seamounts were discovered while the Pioneer and Surveyor were exploring the ocean's depths between the Hawaiian and Aleutian Islands. The Pathfinder, operating in the same general area, also reported discovery of an undersea mountain of undetermined height, its peak covered by 750 feet of water.

Announcement of the discoveries was made after the C&GS vessels returned to their West Coast bases and the data concerning the seamounts could be fully analyzed.

Seamounts have a practical significance for submarine and surface ships. They provide vessels, many of which are equipped with echo-sounders, with important undersea landmarks.

Many seamounts are given names by the Board on Geographic Names and their location noted on nautical charts. An undersea elevation is generally regarded as a seamount if it is at least 3,000 feet high and less than 60 miles across the top. Aside from seamounts, the ocean floor is also filled with giant mountain ranges and plateaus. (Coast and Geodetic Survey, U. S. Department of Commerce, Washington, D. C., May 21, 1965.)

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OCEAN CLAM SURVEY OFF U. S. MIDDLE ATLANTIC COAST--1963

By Phillip S. Parker*

ABSTRACT

A cooperative clam survey was conducted during the summer of 1963 by the Eastern Sea Clam Packers Committee of the Oyster Institute of North America and the U. S. Bureau of Commercial Fisheries. The purpose was to locate and assess clam resources in the areas adjacent to those commercially fished. The surveyed areas are off the coast of New Jersey and Delaware on the seaward side of present fishing grounds. Additional concentrations of surf clams (*Spisula solidissima*) sufficient to sustain the commercial fishery at its present rate of production were not found. Many good catches of black quahogs (*Arctica islandica*) were made. The scope of the project has now been expanded, and the Bureau is continuing the survey of potential clam-producing areas in the Mid-Atlantic Bight.

INTRODUCTION

The Atlantic surf clam is one of the largest bivalve mollusks known. It is the largest bivalve living on the Atlantic coast and reaches a maximum size of over 7 inches (Miner 1950). Differences in maximum size, however, occur between geographic regions throughout its range.

This clam is of ancient origin; the species has existed for over 10 million years along the east coast of North America (Chamberlin 1961). Its range is from Labrador to the Gulf of Mexico. To date, the surf clam has been found to occur, generally, from the beach to depths of about 150 feet with occasional specimens taken from deeper waters. Distribution is not homogeneous throughout the range; many areas are very sparsely populated while others have beds of heavy concentration. These beds, commonly called "streaks" or "patches," are of most interest to the industry.

In the various areas of the Atlantic coast where it commonly occurs, the surf clam is known locally by different names: "skimmer clam," "beach clam," "giant clam," "sea clam," "hen clam," "bar clam," and "surf clam." U. S. Bureau of Commercial Fisheries biologists have generally adopted the common name "surf clam" and the scientific name *Spisula solidissima*.

INDUSTRY DEVELOPMENT: From the late 1800's to 1943, the surf clam industry was located along the coasts of New Jersey and Long Island, N. Y. This industry did not become very important until 1943 when, under the stimulus of increased war-time demand, commercial research and subsequent large-scale production were started (Westman 1946). By 1946 catches from surf clam beds adjacent to Long Island's south shore totaled over a half-million bushels a year, yielding about 6.5 million pounds of meats (Ruggiero 1961).

The first signs that many exploited beds off Long Island were being depleted appeared in 1946: boats had to tow faster and work longer hours to maintain their daily catch; a sharp dropoff in the total catch for the area occurred in 1947 and 1948. The 1949 catch improved but since then the catch off Long Island has decreased to a level of less than 50,000 bushels a year.

* Fishery Biologist (General), Exploratory Fishing and Gear Research Base, U. S. Bureau of Commercial Fisheries, Gloucester, Mass.

From 1947 through 1949 unused beds were found near Five-Fathom Banks off the coast of New Jersey and since then New Jersey has been the leading producer of surf clams. A tremendous increase in production has become possible because of (1) the discovery of the new beds, (2) the development of better processing methods, and (3) greatly improved harvesting methods.

GEAR DEVELOPMENTS: One of the factors limiting production during the early history of the clam industry was the harvesting gear used. The earliest methods were hand raking, tonging, or simply hand picking of the clams along the shore above the low-water mark where they were often stranded after storms. All of those methods are inefficient as they require a great amount of time and effort for the volume of clams produced.

To harvest clams in the areas lying beyond the low-water marks, other methods had to be devised. Small box-shaped steel-slatted dredges were the first power-hauled equipment used by fishermen. Those dredges were towed behind small boats and brought in over the stern by means of booms and winches. As the demand for clams increased, successively larger size dredges were built which required larger and more powerful boats. The early dredges had many drawbacks (many of the clams taken by them were either broken or had damaged meats) and attempts were made to improve them.

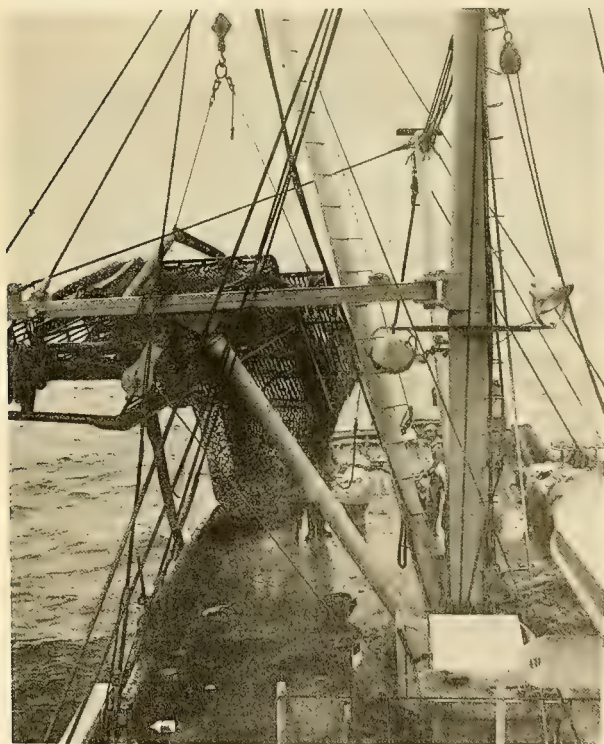


Fig. 1 - Experimental 84-inch wide dredge used on the vessel
Gail Borden.

Late in 1945, industry experiments were begun to improve dredges by using hydraulic means for digging. This modification was rather simple: water, pumped under pressure, was used to wash out the clams in front of the dredge blade. After some experimentation, this technique was perfected and it is the principal method used today. The use of water jets made towing the dredge much easier and

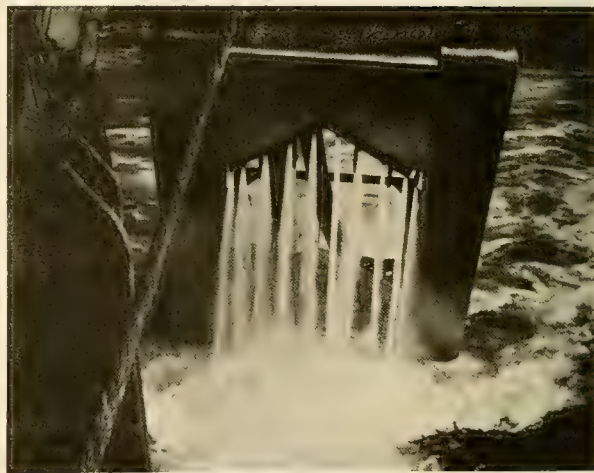


Fig. 2 - Hydraulic jet-dredge of the type used in the commercial fishery. A similar dredge was used for the survey.

greatly reduced injury to the clams. The present trend, as previously with the earlier non-hydraulic dredge, is toward building larger and more efficient dredges. The larger units have blades up to 84-inches wide (fig. 1) with jets supplied by pumps that deliver 3,500 gallons of water per minute at pressures exceeding 130 pounds per square inch. The standard "40-inch" (dimensions refer to the width of the dredge's blade) hydraulic dredge, however, is the one most commonly in use today (fig. 2). The 40-inch dredge also requires a considerable amount of water for efficient operation. To supply this a 1,500 g.p.m. centrifugal pump driven by diesel power is located below the fishing vessel's deck (early powered pumps were usually gasoline-driven units mounted on the deck of the fishing vessel) and connected to the clam

dredge by lengths of special 5-inch i.d. clam-jetting hose, the length of which depends upon the fishing depth. Doubled 5- or 6-inch hoses are used on some of the larger vessels to carry water to the dredges.

VESSELS: The present clam fleet is made up primarily of vessels from other fisheries that have been re-rigged for jet dredging. Included are conversions of Florida shrimp boats, oyster boats, trawlers, and naval-type craft. They range in size from 60 to 150 feet and most of them are powered with diesel engines. The size of the fleet varies because some vessels shift seasonally from clam dredging to other types of fishing. About 52 of them remain year-round in the clam fishery. Those boats can, in good production areas, each catch 500 to 600 bushels of clams a day, but during the past several years they have operated on industry-imposed quotas of 200 and 300 bushels a day. Today, because of depletion of the best producing areas, daily catches have decreased and most of the boats are bringing in all they can produce. The boats are generally operated by a crew of 3 or more men and are owned or controlled by individual packing companies. At the present time there are about 9 major packers or processors of surf clams on the east coast.

FISHING AREAS: The major fishing area now in use is off Point Pleasant, N. J. There appears to be enough large clams left in this area to keep the industry in operation for a few more years, but in order to maintain present production levels new equally productive beds must be located. The new beds must be productive enough to sustain a profitable fishery while younger clams on the old beds or from new "sets" grow to a commercial size.

The position and depth of any new beds located will have a bearing upon the ability of the clambers to continue with present modes of operation. If new beds are too far offshore and too deep many of the existing vessels will be unable to fish there; most of them, principally because of gear and equipment limitations, are able to dredge only in water less than 100-feet deep. It is possible now to hold harvested clams alive for the several hours required to land the catch from nearby fishing areas but an increase in the distance between the port and fishing area would necessitate either faster vessels or a method for keeping the clams alive for longer periods. A possible alternative might be to "shuck" the clams at sea as is done with scallops.

INITIATION OF CLAM SURVEY: The U. S. Bureau of Commercial Fisheries has made several clam explorations. In 1958, as a result of an industry request at the 1957 Atlantic States Marine Fisheries Commission meeting, a short-term exploration for hard clams (*Mer-cenaria mercenaria*) and surf clams was made in Nantucket Sound (Ropes and Martin 1960). No additional survey work was attempted until 1963. In June 1963, a cooperative research project was agreed upon by the Bureau and the Eastern Sea Clam Packers Committee of the Oyster Institute of North America. The "committee" provided (1) a suitable vessel, (2) fishing equipment, and (3) a crew for exploratory work. The Bureau supplied technical personnel for the survey. A second agreement and a Congressional appropriation in fiscal year 1965 (July 1, 1964 to June 30, 1965) enabled the Bureau to continue that work.

Work accomplished under the first cooperative agreement is the subject of this report.

Three areas were originally picked for the survey and assigned priorities corresponding to the area number. As the survey progressed, a fourth area was picked and assigned top priority (fig. 3). The survey areas are described as follows:

Area I: A rectangular plot (about 40 by 12 miles) with the western boundary approximating the 100-foot depth contour and extending eastward 12 miles. The area is bounded on the north by the 40th parallel and on the south by lat. 39°20' N. (Mannasquan to Atlantic City, N.J.).

Area II: An area extending southwestward from Area I of about the same size and shape. The north boundary is adjacent to Area I; the south boundary approximates lat. 38°46' N. (opposite Cape May, N. J.).

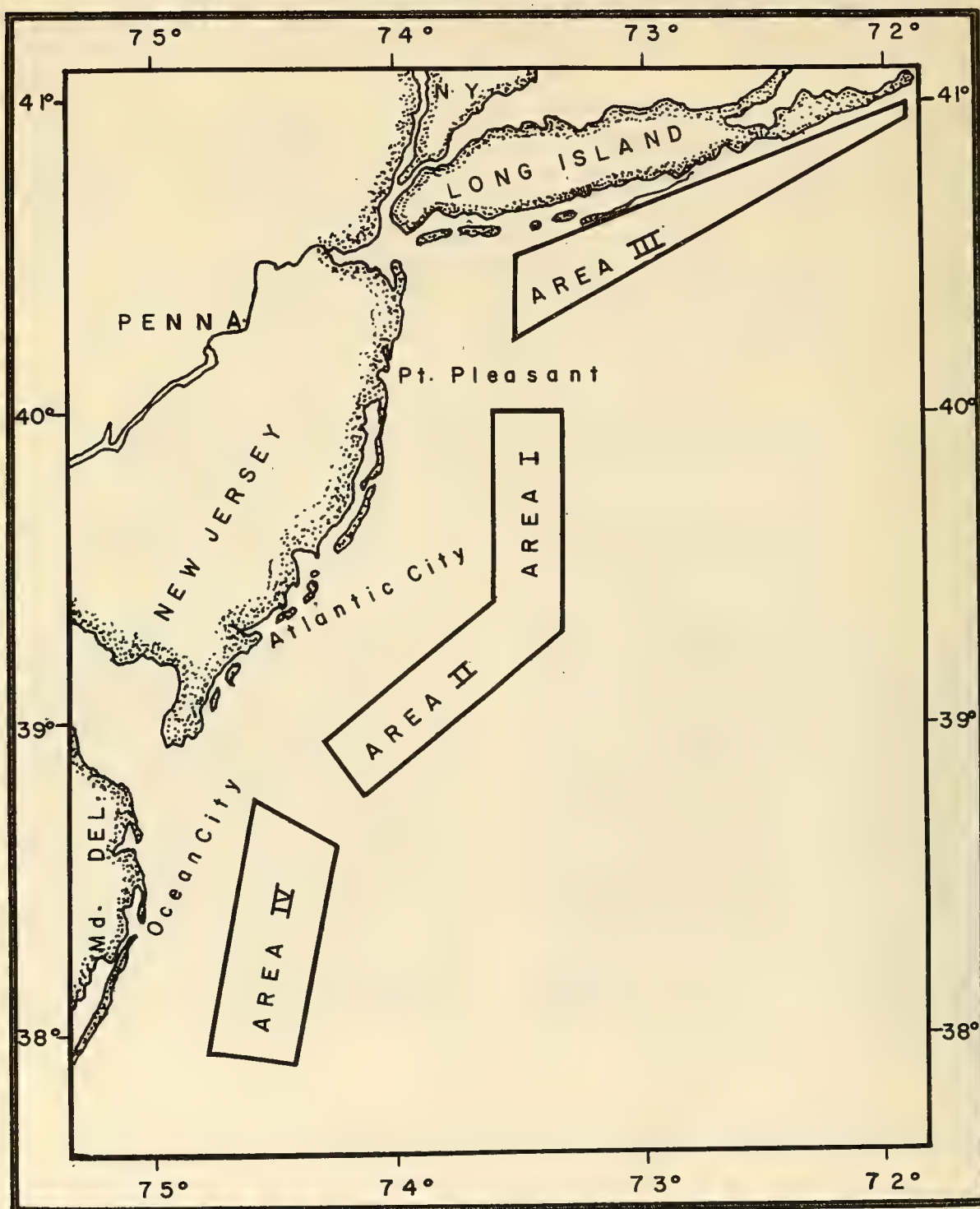


Fig. 3 - Clam survey areas off the middle Atlantic coast; Areas I, II, and III are those areas originally suggested by the Sea Clam Committee members and agreed to by the Bureau. The numbers are arranged according to the priority originally assigned each. The Committee requested that Area IV be surveyed during the last 6 weeks of the survey.

Area III: Waters adjacent to the south shore of Long Island, N. Y., between the 10- and 20-fathom depth contours.

Area IV: The north boundary is lat. $38^{\circ}47'$ N., the latitude of Cape Henlopen, Dela.; the south boundary is lat. $37^{\circ}55'$ N., near Winter Quarter Light. East and west boundaries were set about 8 miles on each side of a straight line approximating the 120-foot contour.

SURVEY PROCEDURE

VESSEL AND DREDGE EQUIPMENT: In early July 1963, a chartered vessel was readied for the survey. Originally it was planned to use a medium (one-half cubic yard) industrial earth-moving clam-shell type bucket for sampling purposes. It was believed that this unit might be a more efficient piece of gear for sampling than the clam dredge because all material on the bottom encompassed by the bucket would be retained, and an accurate assessment of all material within the area sampled could thus be made. Early trials, however, showed that this unit could not be satisfactorily operated from the vessel and the bucket was replaced by a small 20-inch nonhydraulic dredge of a type originally used by the industry.

The nonhydraulic dredge was likewise discarded early in the survey and replaced with a 30-inch wide hydraulic jet-dredge similar to those in use by the industry (fig. 2). The sides of that dredge were lined with one-half inch hardware cloth and the distance between the knife grids was reduced by adding extra slats to the blade to retain the smaller sizes of clams. Also, the chain bag was replaced by a small nylon-mesh cod-end bag, but despite those changes some of the smaller clams were lost. Compared to the "dry" dredge, the jet-dredge reduced breakage of the clams, increased the numbers caught, and improved the size range of the clams taken.

Clam-Sounder: A "clam-sounder" was used experimentally throughout the survey. This was similar to a prototype that had been built and used by an industry vessel during limited earlier survey work. During the first period of the 1963 survey, an enlarged model of the unit was used (fig. 4). This sounder was towed separately from the dredge.

The main component of the sounder is a hollow waterproof tube inside of which small microphones are attached to a wooden panel. The tube body is attached to a sled-like carriage so that the unit will slide along the surface of the bottom. Welded in a row along one side of the tube (fig. 4) are many steel fingers. When one or more of the fingers strikes any object the sound produced is picked up by the microphones, amplified, and reproduced in the pilothouse. The sound of the fingers striking upon surf clams can readily be distinguished, by an experienced operator, from extraneous sounds so that a general indication of the relative abundance of clams in the path of the sounder can be obtained.

A log of the sounds transmitted by the sounder, while being towed between stations, was kept and those data were correlated with the sample collected at each sampling station.

During the last period of the survey, a shorter clam-sounder was attached directly to the dredge just in front of the jet manifold so that the dredge acted as a sled for the sounder.

The clam-sounder was of less use during the 1963 operations than was anticipated because of frequent flooding of the sounding tube and the enclosed microphones. The effective-



Fig. 4 - Clam sounder (at rail of vessel) used during survey operations. Note "teeth" mounted on pipe. Telephone microphones which transmit the sounds of clams being struck by the teeth are secured inside the pipe.

ness of the principle of sounding for clams in this manner, however, was established; Bureau electronic specialists designed a more dependable model with specially designed submersible hydrophones for underwater sound detection for use during succeeding survey work.

SAMPLING STATIONS: It was not possible in a limited time to completely investigate any of the four survey areas. The survey began in the southern section of Area I and was shifted to Area IV for the last 6 weeks. Sampling stations were established 1 mile apart on a grid pattern within each area arranged to coincide with LORAN lines. Unsurveyed portions of any area can thus be located and completed at a later date without difficulty.

A sample was taken at each station by a 5-minute tow of the jet dredge. Elapsed time of the tow included only the period when the water was flowing at maximum volume through the jets of the dredge.

The surf clams and black quahogs in each sample were measured and weighed, and additional pertinent data, such as bottom type and other organisms present, were recorded for the remaining material in the catch.

SURVEY RESULTS

AREA I: Surf Clams: In Area I, 148 of the 181 stations surveyed yielded small quantities of surf clams, usually mixed with black quahogs (fig. 5). As the survey progressed northward from the southern boundary of the Area, the number of stations producing surf clams increased but at no time were they found in sufficient concentrations to be of commercial interest in the surveyed portion of Area I. To support commercial fishing operations a minimum catch rate of about $\frac{1}{4}$ bushel per minute of towing time is required. (Catches of one-half bushel or more of surf clams per 5-minute tow are listed in the appendix.)

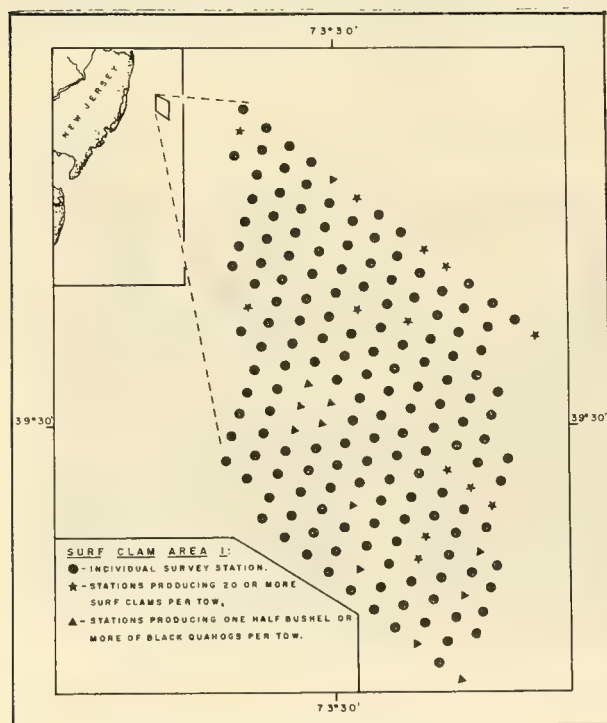


Table 1 - Size Distribution of Surf Clams Taken at Selected Sampling Stations in Areas I and IV		
Length of Clams		Number of Clams
Millimeters	Inches	Individuals
0-19	0- .7	1
20-39	.8-1.5	11
40-59	1.6-2.3	25
60-79	2.4-3.1	6
80-99	3.1-3.9	8
100-119	3.9-4.7	34
120-139	4.7-5.5	95
140-159	5.5-6.3	391
160-179	6.3-7.0	77

Surf clams of all sizes, except those below three-quarters of an inch long which were too small for the gear to retain, were found in the Area (table 1). This wide variation indicates that populations of various size and age occur in the area. Surf-clam shells in various

amounts were taken in almost every tow along with shells of other mollusks.

Black Quahogs: Black quahogs were found with the surf clams in almost all of the tows in which the latter were taken. In Area I they were more abundant than the surf clam, occurring in 170 of the 181 station samples with a maximum catch of over 300 pounds (3.7 bushels) per 5-minute tow. In general, that clam was more concentrated in the southern part of the Area.

AREA IV: Surf Clams: In Area IV, 312 stations were sampled (fig. 6) with much better results than in Area I. Up to 2.8 bushels of surf clams were taken per 5-minute tow; 15 tows produced 1 bushel or more. A catch of 2.8 bushels in five minutes of fishing with a 30-inch dredge would indicate a possible catch of about 15 bushels per 20-minute tow with a regular 40-inch dredge. Such a yield equals

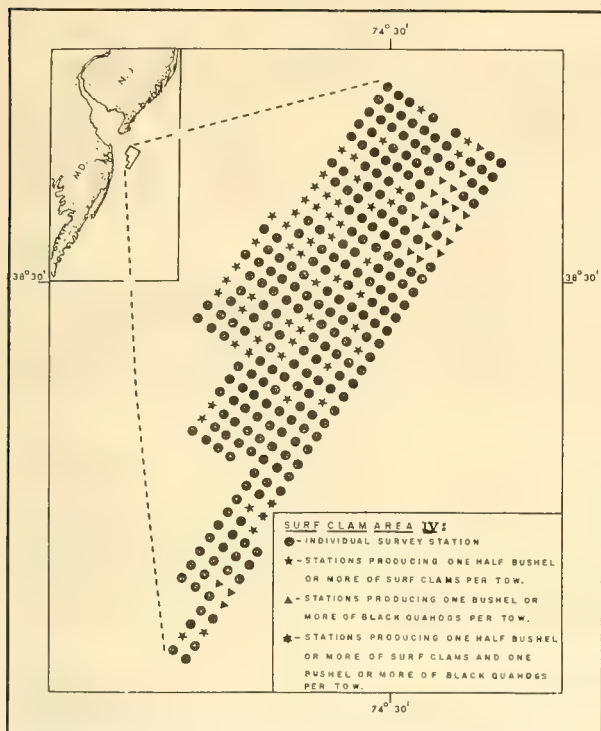


Fig. 6 - Locations of survey stations in Area IV.

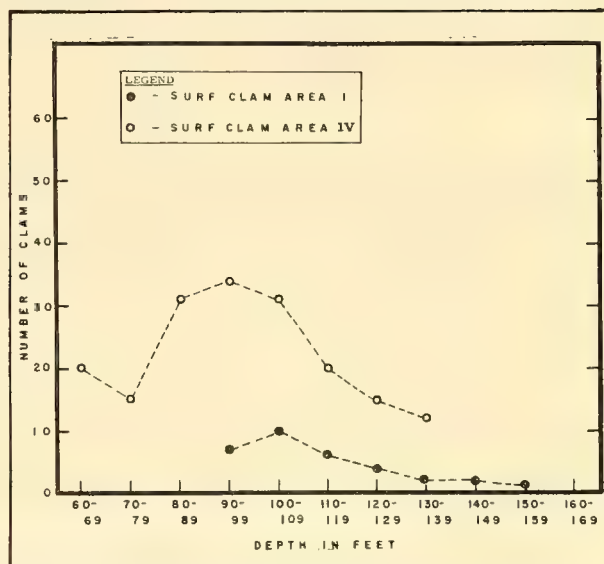


Fig. 7 - Abundance distribution of surf clams in Areas I and IV plotted by 10-foot depth intervals for those stations where this species was caught.

good commercial catches. In this Area, as in Area I, surf clams of all sizes were found within the fishing capabilities of the gear. Best catches were made in depths of 80 to 119 feet but no surf clams were found in depths of over 135 feet (fig. 7 and table 2).

The percentage of sampling stations where surf clams, unmixed with black quahogs, were taken was much greater in Area IV than in Area I. This difference may partly reflect the concentration of sampling effort in

Table 2 - Bottom-Depth Distribution of Surf Clam and Black Quahog Catches in Areas I and IV, Based on 5-Minute Tows and Averaged by 10-Foot Increments

Depth of Water Feet	Number of Surf Clams		Number of Black Quahogs	
	Area I ^{1/}	Area IV ^{2/}	Area I	Area IV
60-69	-	20	-	-
70-79	-	15	-	-
80-89	-	31	-	-
90-99	7	33	4	2
100-109	10	31	7	12
110-119	6	21	16	26
120-129	4	15	37	108
130-139	2	12	116	193
140-149	2	-	61	314
150-159	1	-	43	-
160-169	-	-	53	-

^{1/}Area I fished with 20-inch dredge.

^{2/}Area IV fished with 30-inch dredge.

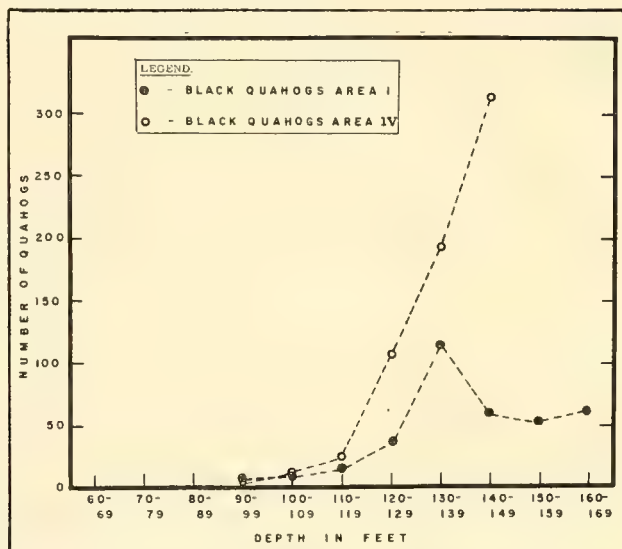


Fig. 8 - Abundance distribution of black quahogs in Areas I and IV plotted by 10-foot depth intervals for those stations where this species was caught.

depths of 110 feet or less. During the survey no black quahogs were found in depths of less than 89 feet; conclusions concerning relative abundance of black quahogs within the two areas, therefore, should not be drawn from these data.

Black Quahogs: The range of the black quahogs in Area IV was restricted to deeper areas in the northeast section and isolated deep-water spots (table 2 and fig. 8). In those spots their concentration was frequently heavy and catches of up to 4.7 bushels per tow were taken. This corresponds to about 30 bushels per 20-minute tow that could be expected with a 40-inch dredge. The largest catches of black quahogs were made at depths between 120 and 150 feet.

PRODUCTION POSSIBILITIES

Present estimates from the data collected in Area I do not indicate a population of surf clams in the Area of a density required for commercial exploitation. The production potential for surf clams in that area remains uncertain at this time because not enough information is available on the life history and environmental factors effecting the population dynamics of the species to draw any reliable conclusion on its future population densities.

There are populations of black quahogs that could furnish substantial catches if those bivalves were of commercial value. During World War II a short-term fishery developed in New England for that species. Incomplete statistics for 1943 report landings of 720,000 pounds of black quahog meats (Loosanoff 1946). That fishery did not develop because the black quahog has a strong iodine flavor which renders it unpalatable as a fresh product and unsuitable for canning. It would appear, however, that technological advances in the handling and processing of this clam might some day make this apparently extensive additional resource available to the industry.

In Area IV the surf clam populations were found to be greater than in Area I, and no doubt good catches of that species could be taken from parts of this Area by commercial clam fishermen.

Two possibilities appear to exist for increasing production from the resources now known or being used. At present the packers prefer clams which measure 5 inches in length but if a suitable process were developed to handle the smaller clams that are found close to the beaches, an inshore fishery might be developed with existing vessels. Such a development would help avert an impending short supply. A second possibility is the harvesting of beds that are known to be less productive. Profitable harvesting of the more sparsely populated areas, however, would depend upon (1) more efficient dredging equipment that can rapidly cover a greater area or (2) an increase in the price of raw clams.

It appears certain that unless more favorable developments are forthcoming the industry will not be able to maintain production indefinitely at or near 1963 levels. Continuing explorations for additional productive beds and accelerated biological research, as a basis for sound management procedures, are expected to assist materially in stabilization of the surf clam fishery.

SUMMARY

A cooperative joint survey of potential production areas for sea clams off the New Jersey coast was conducted during the summer of 1963 by the Sea Clam Packers Association of the Oyster Institute of North America and the U. S. Bureau of Commercial Fisheries. After unsatisfactory preliminary trials with an industrial clam-shell bucket, a small non-hydraulic dredge was placed aboard the chartered survey vessel for sampling purposes. This dredge also proved unsatisfactory and was replaced with a 30-inch hydraulic-jet dredge for the remaining 6 weeks of survey operations. Better results were obtained with the latter equipment.

Throughout the survey a clam-sounder was used. Because of breakdowns during early trials, little information of value was obtained; however, results of considerable potential are indicated, and a redesigned sounder is planned for future work.

Concentrations of surf clams in Area I, off the coast of central New Jersey, were found to be below the level required for commercial utilization; however, the population of surf clams found to date in Area IV, off the Delaware-Maryland coast, appears sufficient to support limited commercial fishing.

Concentrations of black quahogs were greater than surf clam concentrations in both areas.

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APPENDIX

Abundance of surf clams and black quahogs for those stations where the catch of surf clams was one-half bushel or more per 5-minute tow with bearing and depth recordings in Area IV.^{1/}

Station	Loran Bearing		Depth of Water	Amount of Clams		Station	Loran Bearing		Depth of Water	Amount of Clams	
	1H4	1H5		Surf Clams	Black Quahogs		1H4	1H5		Surf Clams	Black Quahogs
			Feet	..... (Bushels)					Feet	..... (Bushels)	
1-12	3368	3104	105	2.0	0.0	5-20	3272	3088	100	0.7	0.0
1-14	3344	3104	75	1.0	0.0	5-24	3224	3088	87	0.7	0.0
1-16	3320	3104	65	0.5	0.0	5-25	3212	3088	82	0.7	0.0
1-17	3308	3104	90	0.9	0.0	6-8	3416	3084	105	0.6	0.1
1-18	3296	3104	95	1.3	0.0	6-14	3344	3084	100	1.8	0.0
2-6	3440	3100	115	0.5	0.0	6-17	3308	3084	75	0.5	0.0
2-8	3416	3100	115	2.1	0.0	7-6	3440	3080	95	0.6	0.0
2-9	3404	3100	105	0.7	0.0	7-7	3428	3080	105	0.6	0.0
2-10	3392	3100	100	0.5	0.0	7-13	3356	3080	100	1.6	0.0
2-11	3380	3100	100	1.7	0.0	7-16	3320	3080	100	0.5	0.0
2-12	3368	3100	95	1.8	0.0	7-17	3308	3080	97	0.7	0.0
3-6	3440	3096	110	0.5	0.0	7-18	3296	3080	95	0.9	0.0
3-9	3404	3096	95	2.1	0.0	7-19	3284	3080	87	0.6	0.0
3-10	3392	3096	80	0.6	0.0	8-11	3380	3076	95	0.8	0.0
3-13	3356	3096	100	1.7	0.0	9-1	3500	3072	90	0.6	0.0
3-17	3308	3096	80	1.5	0.0	9-2	3488	3072	95	0.7	0.0
3-18	3296	3096	100	0.7	0.0	9-13	3356	3072	105	1.2	0.0
4-4	3464	3092	105	0.5	0.2	9-21	3260	3072	80	0.9	0.0
4-7	3428	3092	115	1.2	0.1	10-15	3332	3068	122	0.6	0.0
4-9	3404	3092	110	2.8	0.0	10-18	3296	3068	105	0.5	0.0
4-10	3392	3092	110	0.7	0.0	11-16	3320	3064	120	0.7	0.2
4-12	3368	3092	105	0.8	0.0	11-20	3272	3064	110	0.8	0.0
4-13	3356	3092	95	0.6	0.0	11-28	3176	3064	95	0.9	0.0
4-20	3272	3092	90	0.7	0.0	12-27	3188	3060	130	0.8	1.6
5-1	3500	3088	105	0.7	0.0	12-28	3176	3060	125	0.6	1.8
5-10	3392	3088	105	0.5	0.0	12-29	3164	3060	125	0.8	0.0
5-11	3380	3088	105	1.0	0.0	12-37	3068	3060	105	0.8	0.0
5-19	3284	3088	65	0.5	0.0	13-36	3080	3056	120	0.6	0.0

^{1/}There were no stations in Area I where the catch came to or exceeded one-half bushel of surf clams per tow.



IDENTIFICATION OF SPECIES IN RAW PROCESSED FISHERY PRODUCTS BY MEANS OF CELLULOSE POLYACETATE STRIP ELECTROPHORESIS

By J. Perry Lane,* Wilma S. Hill,** and Robert J. Learson***

ABSTRACT

A rapid, simple, and relatively inexpensive method--polyacetate strip electrophoresis--has been adapted for identifying species in raw processed fishery products. The method was used to separate the water-soluble proteins in a variety of samples, including drip exuded by products that had been frozen and thawed. The separated protein bands were then stained to establish a band pattern characteristic of each species of fish.

INTRODUCTION

In frozen processed fishery products such as fish blocks, portions, and sticks, it is extremely difficult and, in some cases, impossible to identify, by sensory means, the various species that may be present in the product. The need for identification arises because there often is a cost differential among the species, and a less costly species may be substituted for a more expensive one.

A method used to identify different species is based on electrophoresis. In the electrophoretic technique, an electrical attraction is used to differentially separate muscle proteins. The separation occurs because each type of protein differs in properties such as size and shape of the molecule but primarily because the molecules differ in net electrical charge. The differences in properties cause the protein molecules to migrate towards the electrodes at different rates.

When this technique was applied to the water-soluble proteins of fish, it was found that they gave reproducible characteristic patterns. The separated proteins were then fixed and stained in a supporting medium, such as starch gel, to give a "fingerprint" that is unique for each species.

The separation into band patterns depends on the properties of proteins in their natural state. This means that the sample being identified must not be denatured, as would be the case if the product has been completely cooked. A fully cooked sample cannot be used, but if the central sections of precooked portions are used, the amount of heat received at this point during normal commercial precooking is generally not great enough to denature the protein, so a satisfactory separation can be obtained.

The U. S. Food and Drug Administration was one of the first to apply the electrophoretic technique as an objective method of identifying fish. In 1960, Robert Thompson of that agency reported on a reproducible method of identification by starch gel zone electrophoresis of fish-protein extracts. This method is now employed routinely by the Food and Drug Administration to determine the species involved when substitution is suspected. Since 1962 when this technique was adopted, about 60,000 pounds of fishery products have been seized because of species mislabeling.

Although the Thompson method is reproducible and selective for different species, nonetheless it has several shortcomings that make it difficult for routine use in the field. It is time-consuming, taking 5 hours for electrophoresis alone, and it requires trained laboratory personnel to carry out the procedure.

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Recognizing these shortcomings, this laboratory has been investigating alternate procedures in an attempt to find or develop a method that is rapid, reproducible, inexpensive, and can be performed by untrained persons with a minimum of instruction. This paper reports on an adaptation of a method that fulfills those requirements.

METHOD

GENERAL: A sample of fish protein is applied to a cellulose acetate strip that serves as a supporting medium through which the proteins can travel. A fixed voltage is applied for a definite length of time. At the end of this period, the strips are stained, washed, and dried to fix the patterns.

PREPARATION OF FISH SAMPLES: Fresh: Approximately 3 grams of meaty portion of fish is ground in a mortar with 3 ml. of water and squeezed through several thicknesses of cheesecloth. If a centrifuge is available, pieces of fish may be placed in centrifuge tubes, and the fluid may be expressed by centrifugation. In this case no added water is required.

Frozen: The sample is thawed, and the drip that forms is used undiluted.

Freeze-Dried: Samples are reconstituted with water and treated in the same manner as the fresh samples.

Breaded Raw Sticks and Portions: The breading is removed by soaking the sticks or portions for a few seconds in water and scraping the breading off with a spatula. The samples are then handled as are the fresh or frozen samples.

Precooked Sticks and Portions: The breading and all surface meat is trimmed until the internal center section remains. This section is then treated as is a fresh sample.

EQUIPMENT: The cellulose polyacetate strips and the electrophoresis cabinet described below are products of the Gelman Instrument Company 1/; similar equipment may be obtained from other sources. The equipment (fig. 1) consists of (1) an electrophoresis cabinet divided into 4 compartments and (2) a constant-voltage power supply with an output potential of 300 volts.

Gelman Applicator
Cellulose acetate strips ($6\frac{3}{4}$ " x 1")
Capillary tubes
Filter paper Whatman #1 sheets cut to convenient size

CHEMICALS:

Veronal buffer (pH 8.6 ionic strength 0.05)
Sodium diethylbarbiturate 10.8 grams
Diethylbarbituric acid 1.5 grams
Distilled water to 1000 ml.

Stain
200 mg. Ponceau S stain dissolved in 100 ml. 5-percent trichloroacetic acid

Wash
5-percent acetic acid

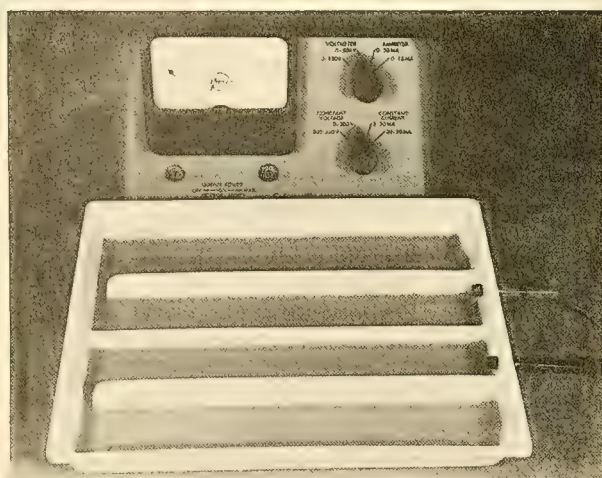


Fig. 1 - Electrophoresis cabinet and power supply.

PROCEDURE: 1. Soak the cellulose polyacetate strips for 30 minutes in the buffer (soaking is required to bring the strips back to their original gel structure). Use a new buffer supply each time. Since 6 strips can be run simultaneously, each with a different sample, identify each strip with a pencil notation before soaking it.

1/Trade and company names referred to in this publication do not imply endorsement of commercial products.

2. Add chilled (34° F.) buffer to each chamber of the cabinet and level to a point slightly below the compartment dividers.

3. After 30 minutes, remove the strips from the buffer, and gently blot them between sheets of Whatman #1 filter paper.



Fig. 2 - Application of sample to acetate strip.

4. Take up a sample of tissue fluid into a capillary tube, and transfer the sample to a special applicator. Draw the capillary tube along the applicator to within $\frac{1}{4}$ inch of both ends. Then press the applicator firmly against the strip about 2 inches from one end (fig. 2). Place the strip containing the sample across the cabinet dividers so that the sample is on the cathode side and both ends are immersed in the buffer in the 2 outer chambers.

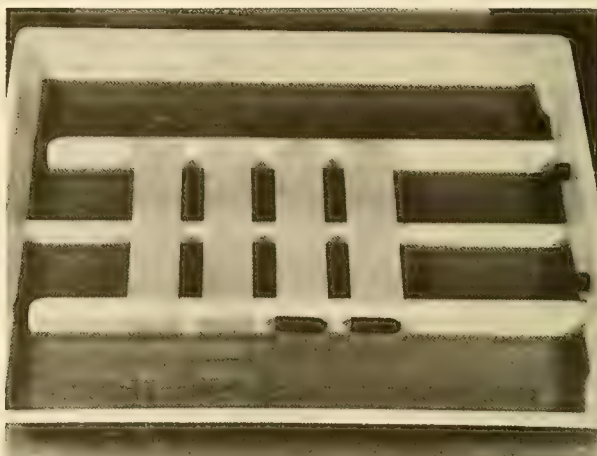


Fig. 3 - Electrophoresis cabinet showing strips secured in place.

Secure the acetate strips at each end with magnets or glass wedges to prevent slippage. Keep them taut (fig. 3).

5. Put the cabinet cover in place.

6. Connect the electrodes and set the power supply at 300 volts for 30 minutes. At the end of this time, shut off the power supply.

7. After the power supply is shut off, remove the strips from the cabinet, and place them in Ponceau S stain for 5 minutes. Then immerse the strips in a series of 3 rinsing solutions of 5-percent acetic acid to remove the excess dye. Rinse the strips until only the protein bands are left stained and the remainder of the strip is free from dye. Finally, blot the strips and dry them between several sheets of filter paper. Once the strips are completely dry, they may be retained as a permanent record.

RESULTS

Three or more samples each of ocean catfish, cod, cusk, haddock, ocean perch, pollock, and whiting were analyzed at separate times with consistent results. This method was also used for identifying (a) 122 samples of drip, (b) 26 samples in the dehydrated and precooked states, and (c) approximately 30 samples submitted by the inspection service. The results were verified by running known samples along with the unknown samples and comparing the patterns. Also, the accuracy of this method was confirmed by running duplicate samples, using other techniques.

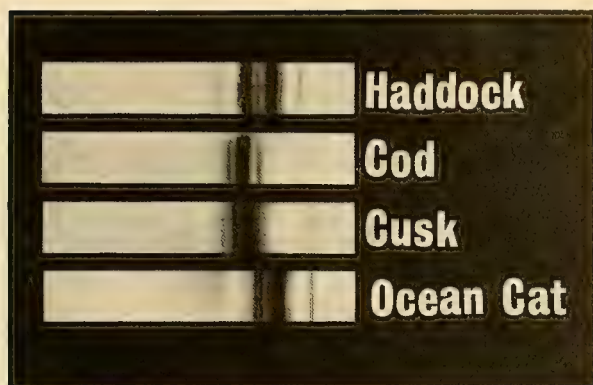


Fig. 4 - Typical acetate patterns from four different species.

Figure 4 illustrates the different patterns obtained from 4 common local species of fish.

CONCLUSIONS

This method of fish-species identification has several advantages over other electrophoretic methods in use:

1. It is more rapid, requiring only 45 minutes to complete after the strips have been soaked.
2. The reagents for the buffer, rinse solutions, and dye can be obtained premeasured from most chemical supply houses and require only dilution to volume.

3. The techniques are relatively simple; any person who is willing to exercise care can be readily trained to perform this analysis.

The cost of the basic equipment, including the power supply, ranges from about \$150-\$250, depending on the source. At the present time, the Bureau of Commercial Fisheries Technological Laboratory at Gloucester is investigating the possibility of reducing the cost of the cabinet equipment by using readily available materials to fabricate a homemade unit.

In the future, the possibility of species substitution in processed fishery products will undoubtedly be scrutinized more closely by regulatory agencies. It will, therefore, be to the advantage of a producer working with raw materials that have already been processed to some degree to have at his disposal a rapid, reliable method for determining the species in such products. First of all, such a method will ensure that he is receiving the species for which he is paying; secondly, it will preclude the possibility of conflict with regulatory agencies over the question of species when the finished product bearing the processor's name reaches the market place.

The use of the polyacetate strip electrophoresis technique provides a rapid and reliable method for doing this. It has the further advantage of being simple enough to permit application by those untrained in laboratory procedures.

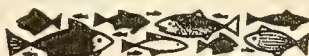
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Created in 1849, the Department of the Interior--a department of conservation--is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

As the Nation's principal conservation agency, the Department works to assure that nonrenewable resources are developed and used wisely, that park and recreational resources are conserved for the future, and that renewable resources make their full contribution to the progress, prosperity, and security of the United States--now and in the future.



TRENDS AND DEVELOPMENTS

A METHOD OF FORECASTING THE RELATIVE ABUNDANCE OF NORTHERN SHRIMP (*Pandalus borealis* Kr.) IN MAINE WATERS

By R. L. Dow*

Northern shrimp (*Pandalus borealis* Kr.) concentrated on spawning grounds of Maine in-shore waters have been fished commercially each year since the 1937/1938 spawning season. Spawning activity reaches a peak during February and March, although commercially attractive schools have been found in some years as early as October and as late as June.

Table 1 - December Sea Water Temperatures
and Shrimp Landings Two Years Later

Spawning Year	Temperatures °F.	Shrimp Landings 1,000 Lbs.	Catch Year
1953/54	48.4	0	1955/56
1954/55	46.6	0	1956/57
1951/52	46.2	0	1953/54
1950/51	45.9	38	1952/53
1956/57	44.8	11	1958/59
1949/50	44.3	104	1951/52
1952/53	43.7	0	1954/55
1957/58	42.8	90	1959/60
1948/49	42.5	45	1950/51
1960/61	42.1	529	1962/63
1959/60	41.9	340	1961/62
1937/38	41.7	8	1939/40
1962/63	41.5	2,068	1964/65
1946/47	41.3	10	1948/49
1961/62	41.2	898	1963/64
1958/59	41.0	64	1960/61
1955/56	40.8	5	1957/58
1943/44	40.1	162	1945/46
1947/48	40.0	7	1949/50
1940/41	39.7	292	1942/43
1941/42	39.5	389	1943/44
1944/45	39.2	194	1946/47
1935/36	37.9	83	1937/38
1942/43	37.4	554	1944/45
1938/39	37.3	54	1940/41
1936/37	36.0	18	1938/39
1939/40	33.7	79	1941/42
1945/46	31.1	27	1947/48

Shrimp abundance has been associated with sea water temperatures during the period of spawning two years preceding their entry into the fishery (Dow 1963). This association includes all months from October through July. Typical of the association is the record shown in table 1 of December sea water temperatures as measured at Boothbay Harbor by the U. S. Fish and Wildlife Service and landings of shrimp during the fishing season two years later.

*Research Director, Department of Sea and Shore Fisheries, Augusta, Maine.



Fig. 1 - Northern shrimp (*Pandalus borealis* Kr.)--the smaller sizes are discarded.

Table 2 - Temperature Ranges by Months and Shrimp Landings Two Years Later

Month	Temp. Range °F.	Shrimp Landings 1,000 Lbs.	Catch Year
October	53.2-57.6	0	1953/54 & 1954/55
November	49.7-51.3	0	1955/56 & 1956/57
December	42.5-48.4	5	1957/58
January	39.6-43.0	7	1949/50
February	37.0-41.9	10	1948/49
March	39.4-43.0	11	1958/59
April	44.4-45.5	38	1952/53
May	50.4-52.2	45	1950/51
June	56.5-57.9	90	1959/60
July	61.5-63.4	104	1951/52
October	49.2-52.8		
November	44.8-48.6	340	1961/62
December	37.4-42.1	529	1962/63
January	32.8-39.0	2,068	1964/65
February	32.0-36.3	898	1963/64
March	33.6-38.3	292	1942/43
April	37.0-43.5	162	1945/46
May	46.0-50.0	194	1946/47
June	52.9-56.3	389	1943/44
July	55.5-60.8	554	1944/45
October	48.0-		
November	43.8-39.3	83	1937/38
December	37.3-31.1	79	1941/42
January	31.4-	64	1960/61
February	31.7-29.1	54	1940/41
March	32.3-30.0	27	1947/48
April	36.2-34.6	18	1938/39
May	44.4-43.8	8	1939/40
June	52.7-49.8		
July	-		

Within the October-July period, various temperature ranges are associated with varying levels of shrimp abundance and availability two years later, as indicated by landings of this intensive winter fishery. Monthly temperature ranges of the period and shrimp landings within the ranges are summarized in table 2. In general, the greatest abundance is associated with the upper half of the optimum temperature range, while the least abundance is associated with the highest temperature and the greatest fluctuations in temperature. Intermediate levels of abundance are associated with low and intermediately high temperatures.



Fig. 3 - Hand peeling and processing of northern shrimp.

The consistent association of medium-range sea water temperatures with the years of greatest shrimp abundance, of high ranges and unusual fluctuations with zero to low abundance, and of low or intermediately high ranges

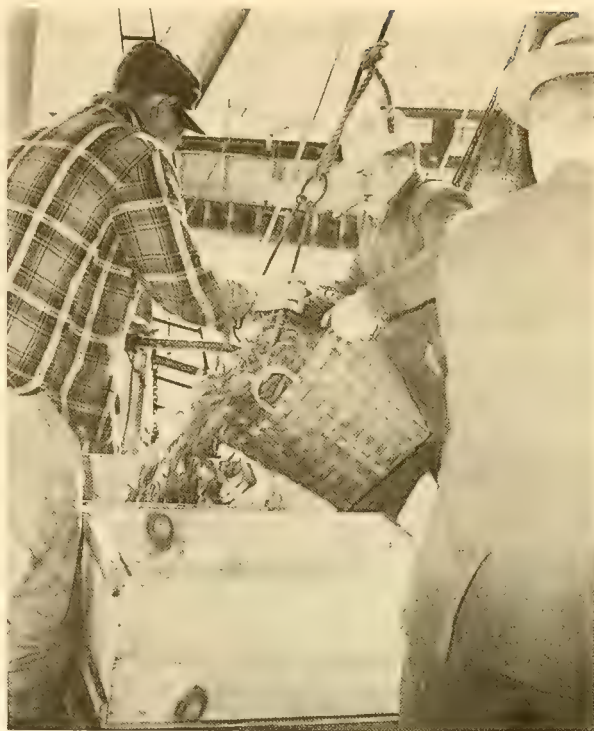


Fig. 2 - Unloading northern shrimp at a Maine processing plant.

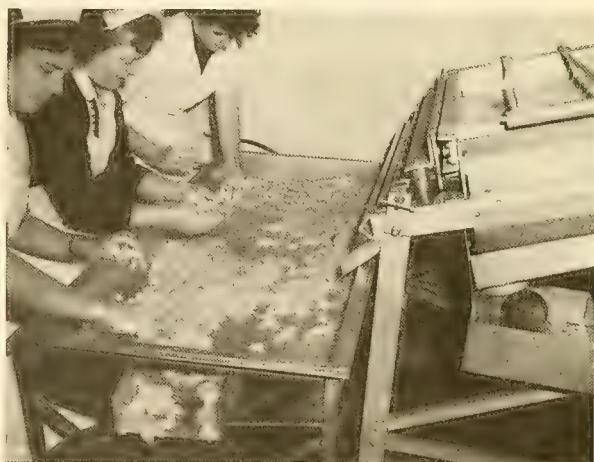


Fig. 4 - Northern shrimp come off peeling machine in a Maine processing plant.

with intermediate abundance, suggests that sea water temperature measurements made at Boothbay Harbor during the spawning year can be used to predict the relative abundance of commercial-size shrimp during the fishing season two years later.

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Fishing Vessel and Gear Developments

EQUIPMENT NOTE NO. 19--

TRAWL COD-END CLOSING DEVICE:

Recently, several new types of cod-end closing devices, "Holland Clip," "Nautilus Clip," and a two-armed clip (produced by the firm Maskinfabrik Iras in Denmark) have made their appearance (Fishing News International 1965). The "Holland Clip" is being used by British bottom, herring, and sprat trawlers (Fishing News International 1964). During 1965, the "Holland Clip" was tested successfully aboard two U. S. Bureau of Commercial Fisheries chartered trawlers, the Western Flyer and St. Michael.

Most Pacific northwest trawl fishermen now use a puckering string tied closed by a hangman's knot. This knot rarely comes untied while fishing, yet it does have two disadvantages: (1) The larger the catch, the more difficult the knot is to release; sometimes three men are required to pull open the knot. (2) Time is lost when splitting large catches aboard the vessel since the knot must be retied after each split is dumped.

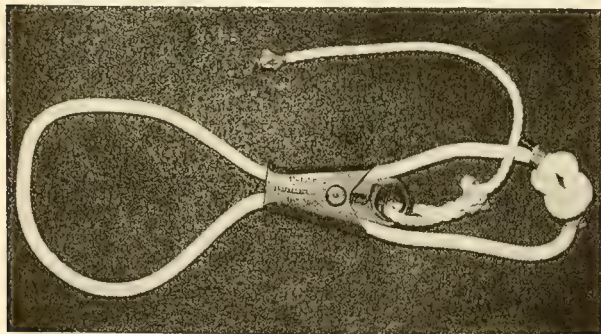


Fig. 1 - Sample "Clip" and puckering string arrangement. Wedge has been pushed into place within the sleeve, leaving only the eye exposed. A piece of rope is tied to the wedge eye for ease of releasing. Note the loose ends of puckering string are tied to prevent "Clip" from being lost if the wedge should loosen.

The "Holland Clip" is composed of a tapered steel sleeve and a grooved wedge fitted within (fig. 1). When the eyed wedge is driv-

en into the sleeve, it binds against a braided nylon puckering string. To release the "Clip," the wedge is pulled out of the sleeve. A short rope tied to the wedge eye facilitates pulling the wedge. The puckering string ends are tied together and seized to prevent them from coming free of the "Clip."

Twist rope was used with the "Clip" aboard the trawler St. Michael. On several occasions after the wedge was released, the rope caught between the wedge corner and the sleeve. This caused the rope to untwist and not pull freely through the sleeve.

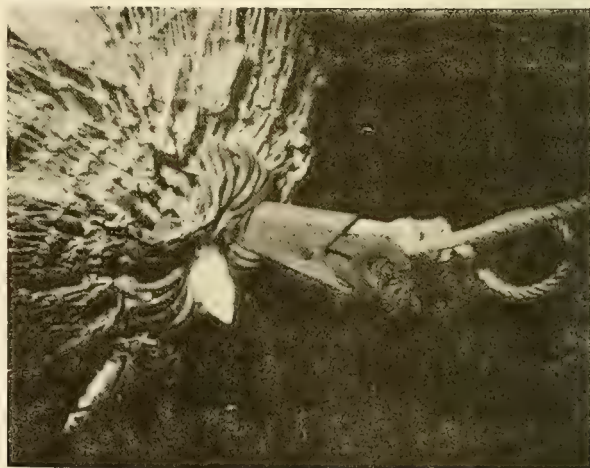


Fig. 2 - Underwater view of "Holland Clip" and closed cod end containing 15,000 pounds of hake. The loosely tied hangman's knot prevents the wedge from releasing accidentally while the net is being set.

On two occasions aboard the trawler Western Flyer, the wedge fell free when no strain was placed on the puckering string as the net was set. This difficulty was eliminated by tying either a loose slip knot or hangman's knot in the free end of the puckering string (fig. 2). This knot was removed easily when the first split came onboard since no strain

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Sep. No. 759

was placed on it regardless of the catch size. The "Clip" was used without a knot during all subsequent splits of the tow.

Catches of up to 60,000 pounds were made during 170 experimental tows by the trawler Western Flyer. As many as 40 splits were required to bring large catches aboard. Hake were dumped into the hold at a rate of about 1,000 pounds a minute during splitting with the "Holland Clip." Comparing this device with the usual method of tying the puckering string when splitting, it is believed that a time saving of over 30 percent per split was made. Almost three splits could be made using the "Holland Clip" in the same time required to make two splits using the hangman's knot. Time saved amounted to nearly two days during the experimental fishing period.

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FISHING NEWS INTERNATIONAL

1964. Cod-End Clip. Fishing News International, vol. 3, no. 4, p. 351.

1965. Cod-End Clips. Fishing News International, vol. 4, no. 3, pp. 350, 353.

--By William W. High,
Fishery Methods and Equipment Specialist,
Exploratory Fishing and Gear Research Base,
U. S. Bureau of Commercial Fisheries,
Seattle, Washington



Alaska

FOREIGN FISHING ACTIVITY OFF ALASKA, DECEMBER 1965:

U.S.S.R.: At year's end about 85 Soviet vessels were involved in ocean perch trawling in the Gulf of Alaska as compared with 15 vessels at the end of 1964. The eastern Gulf continued to be the area of greatest Soviet activity with nearly 70 vessels divided into two nearly equal fleets. One fleet remained fishing the grounds generally west of Yakutat Bay throughout December, after the second split away late in the month and moved again to the area west of Cape Ommaney off Southeast Alaska.

About mid-December, the Soviets reported that bad weather in the Aleutian Islands area prompted shifting of their trawling efforts to the Chirikof Island region southwest of Kodiak Island. By month's end at least 15 trawlers, mostly BMRT factory trawlers, were believed to be fishing between Chirikof and the Shumagin Islands.

Soviet trawling in the central and western Aleutians dropped off to about five BMRT factory trawlers following the transfer of other such vessels to the Gulf of Alaska.

During December, 2 more SRT-M trawlers joined the Soviet shrimp fleet in the Gulf of Alaska, making a total of at least 10 such vessels in that fishery. A group of about 5 of those trawlers was operating east of the Trinity Islands off southwest Kodiak Island. The remaining 5 vessels were working near the Shumagin Islands.

The Soviets indicated vessels were being dispatched to the 1965/66 herring expedition in the central Bering Sea. In past years more than 150 Soviet vessels engaged in that fishery, which is centered generally northwest of the Pribilof Islands.

Japan: Japanese trawling efforts in the Gulf of Alaska involved 4 factory trawlers by the end of December after 2 of the vessels had briefly returned to Japan. One trawler fished south of Unalaska Island just west of Unimak Pass and the others continued to concentrate on the Albatross Bank region off southwest Kodiak Island. Early in 1966, two additional trawlers were scheduled to join the Japanese Gulf fleet.

One factory trawler and a side trawler fished throughout the month in the western Aleutians. A second factory trawler which had been fishing in the area returned to Japan for repairs, but was scheduled to rejoin that fishery in early January.

A factoryship accompanied by 6 trawlers left Japan early in December for the eastern Bering Sea. By mid-month the fleet was fishing just north of Unalaska Island. That fleet was believed to be primarily seeking Pacific ocean perch and possibly Alaska pollock.

* * * * *

SITKA TO HAVE NEW HARBOR:

Sitka will have a new harbor for its growing fishing fleet in 1966. The job is being done under a \$1,076,000 U. S. Army Corps of Engineers contract. Work began in July 1964 and was scheduled for completion by January 1, 1966. The new harbor will have an area of 16 acres and provide space for 450 fishing craft.

* * * * *

KODIAK KING CRAB FISHERY:

King crab fishermen in Kodiak found it increasingly difficult during December to unload their crab catches at Kodiak canneries. Some vessels experienced nearly delays of two weeks between catch and delivery. Cannery operators attributed the problem to a combination of factors. The current season had the advantage of fine weather and catches were exceptional. However, Kodiak lacks sufficient electrical power to operate all of the canneries at full capacity. Compounding the problem further was the shortage of cannery workers.

* * * * *

VESSEL TAXATION CHANGE PROPOSED:

The League of Alaska Cities recommended to Senator Hansen that the vessel tonnage taxation law be repealed. The law allows for taxing vessels by tonnage, with a maximum tax of \$15. It would be replaced by a value proportion assessment on the vessel's fair market value. The law could mean a tax increase of \$50 to \$1,000 a year for each resident Alaskan boat owner. Those hardest hit by the proposed tax would be vessel owners who are replacing gear lost in the earthquake.

**Alaska Fishery Investigations****FOOD HABITS AND BEHAVIOR OF SALMON FRY:**

Over 200 stomachs of pink and chum salmon fry collected in 1965 were examined as part of a U. S. Bureau of Commercial Fisheries investigation of food habits, food availability, and behavior of fry at Traitors Cove. Some of the most important food items are: copepods, barnacle nauplii, barnacle cyprids, and cladocerans. An intertidal species of the insect order Collembola and dipterans, mostly chironomids, were important in some collections. In May 1965, fry were confined in a one-meter plankton net at Traitors Cove to study digestion rates. Stomachs of fish thus deprived of food were emptied in about six hours. The average number of food organisms found in "full stomachs" was about 60 indicating that on the average each fish consumed about 240 organisms a day. Zooplankton densities in June 1965 amounted to 40 organisms per liter in the outer bay. Therefore, only 6 liters of water contained a one-day supply of food for one fish. This relationship between food abundance and demand suggests that zooplankton density was not an

important factor in determining movement, distribution, and survival of fry at that time. A fry and plankton sampling program will be designed for the 1966 field season to further explore relationships between food availability and salmon fry.

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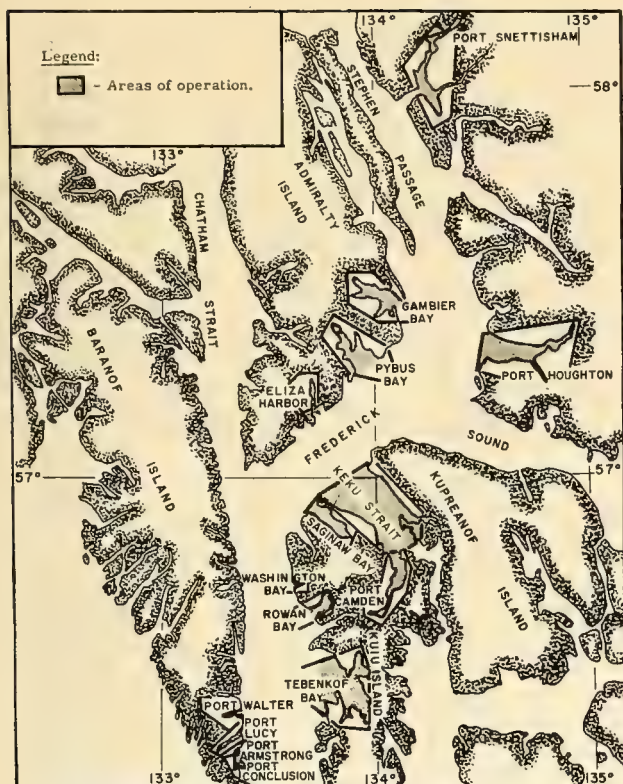
RED SALMON FRESH-WATER SURVIVAL RATES LOW IN KARLUK:

Analyses of red salmon egg-to-smolt survival data for the Naknek and Karluk systems show that for the 4 brood years 1958 through 1961, average survival rate for Karluk was about 0.31 percent while for the same period in the Naknek system, the survival rate from egg to smolt was about 0.75 percent. The average potential egg deposition for Karluk was 561 million and for Naknek 1,504 million eggs. The lower survival rate in the Karluk system is of particular interest because the lake appears to be much higher in basic productivity than the Naknek lakes. Studies to explain this phenomena and to relate it to optimum red salmon production are continuing.

**Alaska Fisheries Explorations and Gear Development****SHRIMP RESOURCES AND GEAR EFFICIENCY STUDIED:**

M/V "John R. Manning" Cruise 65-3 (October 4-December 9, 1965): Gear research on shrimp pot efficiency and design was conducted during a 9-week cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel John R. Manning. Objectives were to: (1) test fish effectiveness of 7 types of shrimp pots, (2) locate commercial quantities of shrimp, and (3) obtain data on distribution and abundance of spot shrimp (Pandalus platyceros).

The 7 experimental shrimp pots were fished by the long-line method. Six of the pots were constructed with metal frames covered with 1½"-nylon web. Included were a cubical 6-tunnel pot, a rectangular 2-tunnel pot, a cubical galvanized 4-tunnel pot, 2 triangular pots, and a collapsible circular pot. The 7th type was a rectangular pot constructed of wooden slats with web tunnels at each end.



Shows areas of operation during M/V John R. Manning Cruise 65-3 (October 4-December 9, 1965).

Each long line consisted of a large surface buoy, a buoy line, and a 40-fathom groundline. One of each type pot was attached to the groundline by 1-fathom dropper lines at 5-fathom intervals. The position of the pots on the groundline was randomly predetermined for each string. Alternate strings were furnished with a recording thermometer.

Echo-soundings were made at each station to determine if the bottom was trawlable. A standard 40-foot Gulf of Mexico shrimp trawl made 13 drags. Twelve pounds of spot shrimp were taken in 3 drags made in Eliza Harbor.

A total of 350 strings of pots was set in the inside waters and bays along Stephens Passage, the north and west sides of Kuiu Island and the southeastern side of Baranof Island (chart). A total of 147 pounds of spot shrimp was taken averaging 22 count (heads on). This was primarily a gear research cruise, concentrated in areas where industry reported locations of spot shrimp. More stations were made in the Keku Strait and Tebenkof Bay areas of Kuiu Island, where 90 per-

cent of the total catch of spot shrimp was taken.

Preliminary analysis of the data indicates the wooden pots were more efficient than the other six pot types. Future work is being planned to obtain more data needed to substantiate the results.

Note: See Commercial Fisheries Review, Dec. 1965 p. 25.



California

FALL 1965 PELAGIC FISH POPULATION SURVEY:

M/V "Alaska" Cruise 65-A-9-Pelagic Fish (October 14-November 3, 1965): The inshore waters, offshore islands, and banks of southern California between Coal Oil Point and the U. S.-Mexican border were explored during this cruise by the California Department of Fish and Game research vessel Alaska.

The objectives were to: (1) determine the distribution and abundance of northern anchovies (Engraulis mordax), jack mackerel (Trachurus symmetricus), Pacific mackerel (Scomber diego), and Pacific sardines (Sardinops caeruleus); (2) make two deep tows to obtain reference collections of bathypelagic species for the proposed Food Habits Study to be conducted under the Bartlett Bill; (3) conduct several daylight fathometer runs to obtain information on fish school distribution using the Westrex Precision Depth Recorder (PDR), model Mark XV; and (4) continue the evaluation of the 30-foot midwater trawl as a sampling tool.

The midwater trawl, blanketnet, and echosounder were the tools used. The larger trawl net (50-foot mouth opening) was used for deep tows and the smaller (30-foot) was used for shallower tows. Eighty-six percent of all tows were shallow, i.e. the bottom of the net was less than 70 feet below the surface. A total of 42 trawl and 44 night-light/blanketnet stations were occupied.

Daylight echo-sounding runs were made on four occasions to locate and count fish schools. No species identification was made of the schools. The largest number of schools was found off the Los Angeles-Long Beach Harbor in water less than 50 fathoms deep.

NORTHERN ANCHOVY: Anchovies were captured in 62 percent of all tows made. In-shore waters, within 5 miles of the mainland, were most productive with 90 percent of the tows successful. Only 36 percent of the tows made in offshore waters and near the offshore islands were successful. The largest fish were caught in the Port Hueneme and offshore areas. Nearly all the anchovies caught in those areas were large adults; gravid females were captured in two offshore tows. Large numbers of pinhead anchovies were found in the Santa Monica Bay area and near La Jolla.

The night-light was not as effective as the trawl in obtaining anchovy samples. Of 44 stations made, anchovies were attracted at 16, or 36 percent, and samples were collected at 3.

The night-light was surprisingly successful in attracting pinhead anchovies in the clear, blue oceanic waters off the coast between Dana Point and La Jolla. Anchovies caught at light stations averaged 129 fish a pound in Santa Monica Bay and 40 fish a pound off Port Hueneme, about the same as those caught by the trawl in these areas.

PACIFIC AND JACK MACKEREL: One Pacific mackerel was caught by hook and line at a light station near San Clemente Island. Jack mackerel were caught at nine stations, eight trawl and one light. The largest catch was 50 jacks caught with the trawl near San Clemente Island. Jacks were 11 to 154 quarter centimeters (4.3-15.2 inches) long.

PACIFIC SARDINE: No sardines were seen or captured during this cruise.

MISCELLANEOUS: Two tows at depths over 200 fathoms were made to obtain reference material of bathypelagic species for the proposed Food Habits Study. About 5,600 fish of 28 species were taken. Pacific hake (*Merluccius productus*) were caught in one of the tows in the Santa Barbara channel.

Two sets of tows in identical areas and depths were made to compare the effectiveness of the two different-sized trawl nets. Because of the time involved in changing nets and bridles the two nets could not be used the same night. The catch of anchovies was essentially the same for each net.

Sixty miles were scouted at night for fish schools, but due to poor bioluminescence in

the water only 1 anchovy and 3 mackerel schools were sighted. Only one day was lost because of poor weather.

M/V "Alaska" Cruise 65-A-10-Pelagic Fish (November 12-December 2, 1965): The coastal waters of central California from Point Reyes to Coal Oil Point were surveyed. Objectives were to: (1) determine distribution and abundance of northern anchovies (*Engraulis mordax*), Pacific mackerel (*Scomber diego*), and jack mackerel (*Trachurus symmetricus*); (2) determine amount of recruitment of this year's Pacific sardine (*Sardinops caeruleus*) spawning and measure the population density of older fish; and (3) make incidental collections for taxonomic study.

The survey was conducted by towing a 30-foot midwater trawl for 15 or 30 minutes at predetermined fishing stations. North of Pigeon Point tows were made in daylight to avoid crab fishing gear; south of Pigeon Point tows were made at night. In all, 43 comparable tows were made: 14 daylight tows in the north, and 29 night tows to the south. A special deep-water tow was made in Monterey Bay. An echo-sounder was operated between fishing stations and a visual watch maintained for fish schools.

Much time was lost due to severe weather conditions. Extensive concentrations of jellyfish and salps made shortening most tows to 15 minutes necessary to prevent net damage.

NORTHERN ANCHOVY: Anchovies dominated the catch. Catches were poor in daylight tows north of Pigeon Point, and few concentrations were detected by visual or electronic means. Only 1 adult anchovy and a small quantity of larvae were caught on the 14 stations fished here.

Anchovies were caught in 26 of the 29 night tows made south of Pigeon Point, in numbers ranging from 1 to 3,500 fish. Seventy-eight percent of the catches contained 200 fish or less. The best catches were made between Pfeiffer Point and San Simeon; the echo-sounder also detected the largest number of schools in that area. The anchovy catch consisted almost entirely of large adults averaging approximately 135 mm. (5.3 inches) standard length.

Gonads were examined but no evidence of spawning activity was detected. Night-schooling behavior quite different than found in more

southern waters was indicated by echo-sounder traces. Well-defined compact schools were consistently detected; continuous light scattered traces typical at night in Mexican and southern California waters were almost completely lacking. Compared with this year's surveys in Mexican and southern California waters, anchovies in central California appeared to be less numerous but much larger.

OTHER ACTIVITIES: Only 1 small jack mackerel was taken and no Pacific mackerel or sardines were seen or captured. Other species appearing in the trawl catches included northern midshipmen (*Porichthys notatus*) and California pompano (*Palometa simillima*). The special deep tow caught a variety of deep-sea fish consisting chiefly of lanternfish (family *Myctophidae*).

Sea surface temperatures ranged from 14.1°C . (57.4°F .) near Point Reyes to 16.4°C . (61.5°F .) at Coat Oil Point. The Davidson Current was evidenced by warm water, averaging about 14.7°C . (58.5°F .), north of Point Arguello. A series of storms accompanied by gale-force winds prevented a more thorough survey of the area.

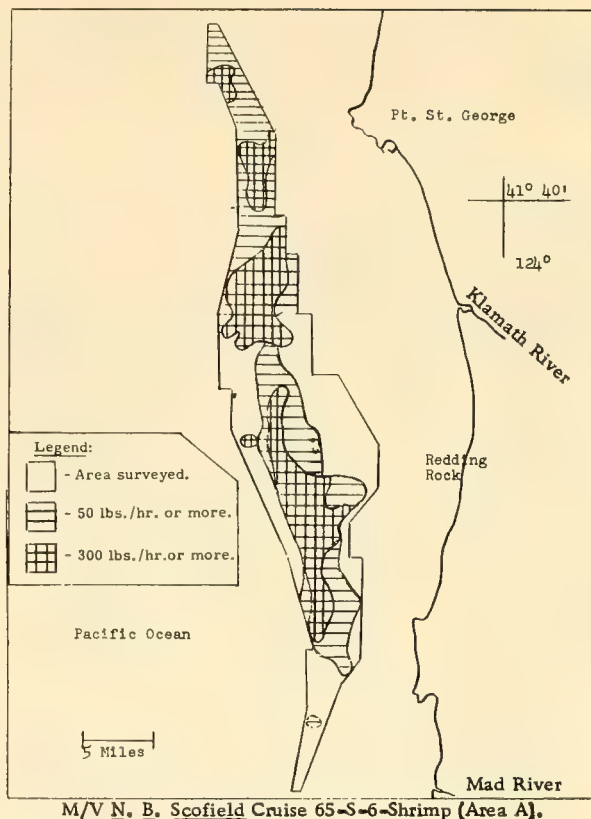
Note: See *Commercial Fisheries Review*, Jan. 1966 p. 18.

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SURVEY OF SHRIMP RESOURCES IN COASTAL WATERS CONTINUED:

M/V "N. B. Scofield" Cruise 65-S-6-Shrimp (September 27-October 22, 1965): The objectives of this cruise by the California Department of Fish and Game research vessel N. B. Scofield in the coastal waters off Eureka and Crescent City were to: (1) Sample randomly concentrations of pink shrimp (*Pandalus jordani*) for determining population estimates and natural mortality rates, (2) determine sizes, sexes, and weights of shrimp; (3) save rare or unusual invertebrates and fish for various collections and the State Fisheries Laboratory, Terminal Island; and (4) collect stomachs from Pacific hake (*Merluccius productus*) and arrowtooth halibut (*Atheresthes stomias*) for relative abundance studies of juvenile shrimp.

Three steps of 39 tows each were completed. The tows from each step were distributed at random over the 270-square-mile survey area between the mouth of Mad River and the Oregon border. The average distance of each tow was $\frac{1}{2}$ mile and covered



an area of 75,950 square feet (with a net opening of 25 feet). Fishing depths ranged from 38 to 108 fathoms. A semiballoon Gulf of Mexico shrimp trawl with 41-foot headrope and 1-inch stretched mesh was used. A $\frac{1}{2}$ -inch stretched mesh liner was used in the cod end to prevent escapement of 0-age shrimp.

The 270-square-mile survey area included 171 square miles where 50 or more pounds of shrimp could be caught per hour. It was found that 300 or more pounds per hour (commercial concentration) could be caught in an area of 60 square miles.

The average catch of shrimp per hour, excluding yields under 34 pounds per hour, was 352 pounds (heads on), and ranged from 34 to 1,831 pounds. An estimated 4.6 million pounds of shrimp remain on the bed. The count per pound ranged from 89 to 608, with a mean of 156.

The stomachs of 191 Pacific hake were examined for shrimp and 85 arrowtooth halibut stomachs were collected for examination in the laboratory. Among specimens collected

were three bearded eelpouts (Lyconema barbatum) and one rough ronquil (Rathbunella allenii).

Note: See Commercial Fisheries Review, Oct. 1965 p. 22.

* * * * *

ABUNDANCE AND CONDITION OF DUNGENESS CRAB SURVEYED PRIOR TO OPEN SEASON:

M/V "N. B. Scofield" Cruise 65-S-7-Crab (November 3-24, 1965): The purpose of this cruise in the coastal waters off Eureka and Crescent City by the California Department of Fish and Game research vessel N. B. Scofield was to: (1) determine preseason abundance and condition of legal and sublegal Dungeness or market crabs (Cancer magister) in the Fort Bragg-Eureka-Crescent City area for predicting the 1965/66 season; (2) collect Pacific hake (Merluccius productus) and arrowtooth halibut (Atheresthes stomias) stomachs for a juvenile shrimp abundance study; and (3) tag sublegal male crabs for growth studies.

Commercial crab traps were fished at 50 randomly selected stations between False Cape and Crescent City. At 29 stations, 10 traps were fished overnight, 10 traps were fished 2 days and nights at 19 stations, and 9 traps were fished at one station overnight, and at 1 station for 2 days and nights. Bad weather prevented taking of samples north of Crescent City and in the Fort Bragg area.

Shoulder widths of crabs were recorded for the entire catch. Shell condition determinations were made for all male crabs. Sublegal male crabs were tagged with suture tags and released between False Cape and Trinidad.

Trawling for Pacific hake and arrowtooth flounder was not possible due to poor weather.

Two of the 500 traps set were lost and 1 was severely damaged. The remaining 497 traps caught 14,792 crabs, including 12,013 legal males (6¼ inches in breadth or greater), 2,746 sublegal males, and 33 females. The adjusted average catch per trap a day was 20.0 for legal and 4.9 for sublegal male crabs.

The False Cape-Trinidad area averaged 22.3 legal and 8.2 sublegal crabs per trap and Patricks Point-Crescent City area 17.8 legal and 1.7 sublegal crabs. The highest station catch (41.4 legal males per trap) was recorded southwest of Trinidad.

The legal crabs were in poorer condition than in the previous season. Overall, 20.5 percent of the legals were soft, compared with 7 percent during the 1963/64 season.

Mating marks were noted on 6.5 percent of the sublegal and 0.3 percent of the legal males. None of the females was gravid.

Based on preseason surveys and season catches for the past 2 years, and this year's survey, the total crab catch for the Fort Bragg-Eureka-Crescent City area should fall between 6.7 and 6.9 million pounds. This would exceed the 20-year average of 6.2 million pounds for the first time since 1961.

A total of 257 sublegal male crabs were tagged and released between False Cape and Trinidad.

Note: See Commercial Fisheries Review, February 1966 p. 15.



Cans--Shipments for Fishery Products, January-November 1965

A total of 2,796,426 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-November 1965 as compared with 2,592,360 base boxes used during the same period in 1964. In 1965, there were increases in the U. S. canned pack of Maine sardines and Gulf shrimp.



Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES OF FRESH AND FROZEN FISHERY PRODUCTS, NOVEMBER 1965:

Armed Forces purchases of fresh and frozen fishery products for most major items in November 1965 were generally higher than in November 1964. Purchases were up substantially for flounder fillets, haddock fillets, ocean perch fillets, scallops, oysters, and shrimp.

Principal Fresh and Frozen Fishery Products Purchased by
Defense Subsistence Supply Centers, November 1965
with Comparisons

Product	Nov. 1965		Nov. 1964	
	Qty. Lbs.	Avg. Cost Cents/Lb.	Qty. Lbs.	Avg. Cost Cents/Lb.
Shrimp:				
raw headless	132,800	96	96,150	97
peeled and deveined	292,300	133	240,288	133
breaded	367,400	89	341,550	88
molded and breaded	52,928	67	26,300	64
Total shrimp	845,428	104	704,288	104
Scallops	225,600	70	165,200	72
Oysters:				
Eastern	110,087	127	63,340	110
Pacific	26,050	88	26,396	74
Total oysters	136,137	120	89,736	100
Clams	-	-	12,630	35
Cod fillets	37,300	38	23,400	33
Flounder fillets	318,900	42	161,800	31
Ocean perch fillets	372,600	34	259,250	29
Haddock fillets	165,955	40	114,760	33
Haddock portions	52,500	50	131,500	49
Halibut steaks	39,400	63	73,950	48
Salmon steaks	11,375	70	21,110	72
Swordfish steaks	450	68	3,761	58

Compared with the same month in 1964, prices in November 1965 were up for flounder fillets, ocean perch fillets, and haddock fillets.



Fur Seals

INTERIOR DEPARTMENT ISSUES NEW PROPOSALS FOR IMPROVED PROCESSING TECHNIQUES OF ALASKA SKINS:

A second invitation to firms interested in research and development in the processing of Alaska for seal skins was issued December 14, 1965, by the U. S. Department of the Interior. The invitation responded to interest expressed by processors who were unable to reply prior to the closing date for the previous invitation issued in early 1965.

Firms submitting acceptable proposals were to be asked to process sample seal skins to demonstrate their capabilities of performing more extensive research and development work with proposals to be submitted to Interior's Bureau of Commercial Fisheries by January 31, 1966. There are sufficient raw seal skins to support only a very limited number of new research contracts.

In September 1965, the Pierre Laclede Fur Company, St. Louis, Mo., was awarded

a one-year contract for a research program to make Alaska sealskins more attractive to the public by improving processing techniques and developing new products.

The research contracts require firms to seek better ways to dress the leather, develop a variety of fur colors, improve shearing, and fashion new luxury fur products. The seal skins used under the research and development contracts remain the property of the Government and most of them will eventually be sold at auction. The Bureau expects that proceeds from sales will offset the cost to the Government of the research and development work.

The Bureau of Commercial Fisheries manages and harvests the fur seals of the Pribilof Islands, 300 miles off the Alaskan coast in the Bering Sea, and cures the seal skins before shipping them to a processor.

Under an existing contract, seven-eighths of the fur seal harvests through 1967 will be delivered to the Fouke Fur Company, Greenville, S. C., for processing and sale. The remainder of the seal skins is reserved for experimental processing contracts with other interested firms.

Each year the United States harvests about 60,000 surplus young animals, of which about 45,000 processed pelts are sold for the United States account. Under the terms of the North Pacific Fur Seal Convention of 1957, Canada and Japan each receive 15 percent of the annual separate harvests of the United States and the Soviet Union. Alaska receives 70 percent of the net proceeds from the semi-annual fur seal auctions of United States seal skins.

Other seals of the same species breed at rookeries on islands off the coasts of Russia and Japan. Those rookeries are administered by the Soviet Union.

Note: See Commercial Fisheries Review, January 1965 p. 29.



Great Lakes

MICHIGAN PROPOSES CHANGE IN YELLOW PERCH COMMERCIAL FISHING REGULATIONS:

Public hearings were held in January 1966 by fisheries officials of Michigan's Conser-

vation Department to sound out its plans for improving Great Lakes yellow perch populations by liberalizing commercial fishing regulations.

Discussion at the hearing included proposals to remove closed seasons on yellow perch and lift size limits for processed and "in-the-round" perch.

Both of the planned changes were tentatively approved by the Conservation Commission in October 1965. The one dealing with closed seasons is expected to be modified so that an area near Tawas City will remain off limits to commercial perch fishing from June 10 through September 10.

Note: See Commercial Fisheries Review, December 1965 p. 32.



Gulf Fishery Investigations

Some of the highlights of studies conducted by the U. S. Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., during October-December 1965.

SHRIMP BIOLOGY PROGRAM: Shrimp Larvae Studies: During the quarter, 41 plankton samples collected in June 1964 were examined for planktonic-stage penaeid shrimp. Planktonic stages occurred in most of the sampling area, but they were about five times more abundant in the waters over the Continental Shelf between Galveston and Port Mansfield than between Galveston and the Mississippi River. The overall abundance of young shrimp, however, was only slightly greater than that observed in May 1964.

Planktonic stages of commercially important shrimp, Penaeus spp., also occurred throughout the study area. They were, however, only twice as abundant in the waters west of Galveston as in the waters to the east. Greatest abundance was in the waters between the 15- and 25-fathom contours. Of the total catch of planktonic-stage Penaeus spp., 21 percent were postlarvae, 22 percent mysids, 46 percent protozoae, and 11 percent nauplii. Spawning, indicated by the occurrence of nauplii and protozoae in plankton hauls, was not as intensive as in the preceding month.

During the quarter, measuring of all larval stages of Penaeus occurring in plankton hauls was begun in an attempt to differentiate species by length measurements. Adult shrimp, P. aztecus, P. duorarum, and P. setiferus, although possessing similar life histories, generally occupy different bathymetric ranges. Consequently, length measurements of the earliest larval stages (naupliar and protozoal) may vary bathymetrically, thus providing a gross method for larval species differentiation.

Three attempts were made during the quarter to culture pink and brown shrimp larvae in 150-gallon tanks. Although numerous nauplii were obtained, it

was not possible to rear the larvae through the protozoal stage. The major problem has been to supply adequate numbers of diatoms as food for the larvae. During the summer and early fall of 1965, the diatom Skeletonema sp. was grown in 40-liter cultures by adding the metal chelator EDTA to filtered sea water. Starting in October, it was no longer possible to culture Skeletonema in that manner. It was since learned that additions of commercial fertilizers, iron, and EDTA to sea water will support growth of Skeletonema during the fall months.

Tabulation of data on fish caught in experimental trawling operations along the Texas coast during 1962-64 was completed during the quarter. Data were being constructed for a report dealing with the seasonal distribution and abundance of 30 species of fish occurring over the Continental Shelf along the Texas and Louisiana coasts.

Catches of longspine porgy (Stenotomus caprinus) along the Texas coast were usually greatest on the commercial fishery grounds of the brown shrimp. Those catches were usually in excess of 100 pounds an hour trawled and were made at 15-, 25-, and 35-fathom stations. No species dominated the fish catches made on the white shrimp grounds (shallower than 10 fathoms) off Texas.

Cultivation of Shrimp in Artificial Ponds: One problem encountered during the first experiments to rear shrimp in seminatural ponds was that of obtaining and stocking large numbers of postlarvae collected in the Galveston Pass without also stocking many shrimp predators. To eliminate those problems, attempts were made to obtain a spawn by placing gravid pink and brown shrimp females in the static-water pond and rearing the resulting young through the larval stages. In each of three attempts, recaptured females had spent ovaries the day following their release. Subsequent sampling for eggs and nauplii, however, was unsuccessful.

In another experiment, several thousand pink shrimp nauplii, which had hatched under laboratory conditions, were also put in the static-water pond. They, too, failed to survive. Failure in the initial trials can, in part, probably be attributed to the entanglement of eggs and nauplii in phytoplankton and bottom detritus. Similar results have been observed in laboratory experiments, but they have been eliminated by constant aeration.

During the initial growth studies conducted between March and October 1965, a high mortality of shrimp was noted in the static-water pond following applications of fertilizer. Tests were conducted to determine the toxicity of fertilizers to shrimp and the optimum level of fertilizer necessary for lush plankton growth. The results of the tests will be used as guides for applying fertilizers during the 1966 growth studies.

Movements, Growth, and Mortality of Commercial Shrimps: A mark-recapture experiment was begun on the Florida Tortugas grounds during October to collect additional growth and mortality data on pink shrimp. Three groups of shrimp, representing restricted size ranges (small, medium, and large), were stained with distinctive dyes and released near the center of the fishery. Of the 7,199 shrimp released, 1,024 (14 percent) were recovered. In spite of careful planning prior to the experiment, it is doubtful that the results will be suitable for determinations of mortality rates. It is suspected that significant numbers of stained

shrimp were not detected because unusually good catches forced processors to ship landings to distant plants before they were examined for marked shrimp.

The white shrimp marking experiments conducted in Galveston Bay, Tex., during July and August were completed by the end of 1965. About 10 percent (959 shrimp) of the stained shrimp were returned. Preliminary analysis of the recovery data indicates a dispersion of the marked groups throughout Galveston and Trinity Bays. During the latter stages of the experiment, a seaward movement took place and 12 stained shrimp were recovered from the Gulf.

Commercial Catch Sampling: Studies designed to evaluate the reliability of shrimp landings statistics continued during the quarter. An indication of the variation present in estimates of the size composition of shrimp landings and in the catch per unit of effort by commercial trawlers was obtained by comparing data collected at Freeport and Aransas Pass, Tex., for July through November. Only minor differences were evident in the estimates when fleets from the two ports fished in the same area, indicating that the sampling procedures are reliable.

Laboratory personnel spent considerable time during the quarter taking various shrimp measurements which will be used to establish accurate means for converting length to weight and tail length to total length. These relations are being developed for each sex of the three commercial species of shrimp.

Three additional sampling agents of the Bureau temporarily stationed at Key West and Marathon, Fla., obtained interviews from 85 percent of 937 landings there during October and November. Approximately 600 interviews were obtained by samplers at Freeport and Aransas Pass, Tex., during the same period.

Surveys of Postlarval Abundance and Fisheries for Bait (Juvenile) Shrimp: Routine sampling for postlarval shrimp continued during the quarter at four locations along the Texas coast. With the advent of winter, however, reduced numbers of postlarvae were collected at all stations. Additional tows were made in September to determine whether or not postlarvae tend to skirt the main current when moving through the tidal pass. Collections were taken with a small beam trawl in progressively deeper water beginning at the shoreline of the pass. Results obtained agreed with those from sampling of this type conducted in spring 1964 when it was learned that decreasing numbers of postlarvae occurred with increasing depth from the shoreline toward the channel.

Trawling for juvenile brown and white shrimp for growth data continued on a weekly basis. The Swan Lake sampling site was abandoned in late October following a major fish kill in the area, but weekly trawl hauls continued at a new site in Moses Lake. Juveniles of both species became scarce in late December.

Weekly sampling of the bait shrimp fisheries of Galveston, Aransas Pass, and Pt. Isabel for species composition information continued during the quarter. The 1965 crop of juvenile brown shrimp remained in Galveston Bay longer and accounted for a higher percent of the commercial bait catch than in 1964. Also, bait shrimp production was 47 percent higher for October and November in 1965 than in 1964.

EXPERIMENTAL BIOLOGY PROGRAM: Behavior and Ecological Parasitology: A previous report described burrowing of brown shrimp postlarvae in response to experimentally reduced temperature. This type of behavior, previously unknown for postlarval shrimp, occurred at 12° to 16½° C. (53.6° to 61.7° F.) in the laboratory. According to field observations from workers in the Bureau's Shrimp Biology and Shrimp Dynamics Programs, in nature the numbers of postlarvae collected in the water column per unit effort are quite small when water temperatures are in that range.

Subsequent laboratory results reveal the crustaceans leave their burrows as the temperature increases. This response was observed most frequently in the temperature range of 18° to 21½° C. (64.4° to 68.9° F.). Field workers in the northwestern Gulf of Mexico have noted that the major influx of brown shrimp postlarvae occurs in the early spring when water temperatures have reached that range.

Information is needed to determine how postlarvae move from offshore spawning areas to bay nursery areas. As part of an effort to investigate the problem, six experiments were made intended to estimate the ability of postlarval brown shrimp to swim continuously. For the 56 specimens studied as of that time, individual swimming stamina ranged from 0.0 to 10.5 days of uninterrupted swimming. The mean value was 2.8 days.

Considerable variation in performance between groups of postlarvae seems to be related to their tendency to jump out of experimental containers. Groups in which jumping out was common had the highest mean values for swimming stamina. It is possible that this relation could provide a basis for a method by which the condition of live shrimp could be evaluated.

Identification and enumeration of parasites from samples of shrimp from several Texas bays was continued during the quarter. The latest results showed that the trematode, *Opecoeloides fimbriatus*, is a common parasite in some bays and uncommon in others. Hence, this worm may be useful in tracing shrimp to their nursery areas.

Growth and Survival Studies: An experiment was conducted during the quarter to determine the suitability of fish protein concentrate (fish flour) as food for juvenile and subadult shrimp. Twenty juvenile white shrimp were isolated in 10-gallon aquaria, one per container. During the 27-day experimental period, one group of 10 shrimp was fed the flour and the second group was fed frozen adult brine shrimp. No deaths occurred in either group. As in an experiment previously conducted with brown shrimp, growth of animals fed frozen brine shrimp surpassed those fed the flour. There was a 54-percent weight increase in the group receiving brine shrimp compared with a 29-percent weight increase in the fish flour group.

Experiments were also conducted with postlarvae reared in the laboratory by the staff of the laboratory's Shrimp Biology Program. In one experiment, the effect of temperature on postlarval seabobs was tested using growth as an indicator. Four temperatures were tried--11°, 18°, 25°, and 33° C. (from 51.8° to 91.4° F.). Two hundred animals were involved--50 at each temperature level. Salinity in each instance was 29 p.p.t., the salinity to which the shrimp were accustomed. Growth was best at the two higher temperatures, as

evidenced by increases in weight of 273-fold at 33° C. (91.4° F.) and 167-fold at 25° C. (77° F.). At 18° C. (64.4° F.), there was only a 13-fold weight increase. There were no survivors after the 4th day at 11° C. Though the growth of survivors was greatest at 33° C., survival was poor. Only 23 percent of the test animals survived at that temperature as compared with 56 percent at 25° C. Survival was also low (23 percent) at 18° C.

In a second experiment, laboratory-reared, post-larval pink shrimp were exposed to various levels of temperature and salinity to provide short-term survival data for comparison with that previously obtained with brown shrimp. At the low salinities, 10 p.p.t. or less, the pink shrimp did not survive as well for 24 hours as the browns at any temperature tried--7°, 15°, 25°, 33° C., or 36° C. (from 44.6° to 96.8° F.). At 25 p.p.t. survival was good with 85 percent surviving at 36° C. and 100 percent at the other temperatures (7°, 25°, and 33° C.).

Note: See *Commercial Fisheries Review*, December 1965 p. 34.



Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-November 1965: Based on domestic production and imports, the United States available supply of fish meal for the first 11 months in 1965 amounted to 480,274 short tons--138,564 tons (or 22.4 percent) less than during the same period in 1964. Domestic production was 3,095 tons (or 1.4 percent) higher, but im-

U. S. Supply of Fish Meal and Solubles, January-November 1965			
Item	Jan.-Nov.		Total 1964
	1965	1964	
. . . (Short Tons)			
Fish Meal and Scrap:			
Domestic production:			
Menhaden	165,675	155,302	160,349
Tuna and mackerel	24,654	19,239	21,113
Herring	12,050	8,781	8,881
Other	18,204	34,166	44,909
Total production	220,583	217,488	235,252
Imports:			
Canada	40,046	50,247	54,769
Peru	206,006	319,144	348,025
Chile	5,201	11,407	12,942
Norway	78	-	-
So. Africa Rep.	3,600	15,834	18,581
Other countries	4,760	4,718	4,826
Total imports	259,691	401,350	439,143
Available fish meal supply . .	480,274	618,838	674,395
Fish Solubles:			
Domestic production	91,019	90,557	93,296
Imports:			
Canada	1,373	1,390	1,553
So. Africa Rep.	-	935	987
Other countries	3,650	1,903	1,965
Total imports	5,023	4,228	4,505
Available fish solubles supply	96,042	94,785	97,801

ports were 141,659 tons (or 35.3 percent) lower than in January-November 1964. Peru continued to lead other countries with shipments of 206,006 tons.

The United States supply of fish solubles during January-November 1965 amounted to 96,042 tons--an increase of 1.3 percent as compared with the same period in 1964. Domestic production and imports of fish solubles increased 0.5 percent and 18.8 percent, respectively.

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U. S. FISH MEAL, OIL, AND SOLUBLES:

Production, November 1965: During November 1965, a total of 10,995 tons of fish meal and about 8.2 million pounds of marine-animal oil was produced in the United States. Compared with November 1964, this was an increase of 263 tons of fish meal but a decrease of 66,000 pounds of marine-animal oil. Fish solubles production amounted to 4,328 tons--an increase of 562 tons as compared with November 1964.

U. S. Production of Fish Meal, Oil, and Solubles, November 1965 ^{1/} with Comparisons					
Product	Nov.		Jan.-Nov.		Total 1964
	1965	1964	1965	1964	
. (Short Tons)					
Fish Meal and Scrap:					
Herring	249	405	12,050	8,781	8,881
Menhaden 2/	8,072	7,154	165,675	155,302	160,349
Tuna and mackerel	1,997	2,026	24,654	19,239	21,113
Unclassified	677	1,147	18,204	34,166	34,809
Total 3/	10,995	10,732	220,583	217,488	225,152
Fish Solubles:					
Menhaden	2,888	2,372	71,575	67,045	68,738
Other	1,440	1,394	19,444	23,512	24,558
Total	4,328	3,766	91,019	90,557	93,296
. (1,000 Pounds)					
Oil, body:					
Herring	178	365	7,526	10,261	10,354
Menhaden 2/	6,683	7,339	169,680	152,437	157,730
Tuna and mackerel	766	447	5,094	4,598	4,816
Other (inc. whale)	610	152	5,273	7,160	7,298
Total	8,237	8,303	187,573	174,456	180,198
^{1/} Preliminary data.					
^{2/} Includes a small quantity of thread herring.					
^{3/} Does not include a small quantity of shellfish and marine animal meal and scrap because					

1/Preliminary data.

2/Includes a small quantity of thread herring.

3/Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.



New England

FORECAST OF GROUND FISH AND SEA SCALLOP ABUNDANCE IN 1966 ON NEW ENGLAND FISHING BANKS:

The abundance of the various species of groundfish and sea scallops fished by New

England fishermen will show no drastic changes during 1966, according to the Director of the North Atlantic Region of the U. S. Bureau of Commercial Fisheries. The forecast is based on information provided by biologists of the Bureau's Woods Hole Biological Laboratory who monitor the landings of commercial fishermen and study, by sampling, the populations of fish and shellfish on offshore fishing banks with the Bureau's fishery research vessel Albatross IV.

Haddock landings in New England in 1965 totaled about 115 million pounds--down 2 million pounds from 1964. The decrease in landings in 1965 was due to markedly lowered catches from Browns Bank and the Gulf of Maine; landings from Georges Bank increased by 9 million pounds.

The very abundant 1963 year-class of haddock found by the Albatross IV in its annual fall survey in 1963 started entering the Georges Bank fishery as small scrod in 1965 and will remain a dominant year-class during 1966. As a result, 1966 will be an excellent scrod year on Georges Bank. Surveys by the Albatross IV indicate that the two following year-classes (1964 and 1965) are small ones so the Georges Bank fishery will depend primarily on the single 1963 year-class for two more years.

On Browns Bank the 1963 year-class will not appear in the landings until 1967 because of the slower growth rate on that bank. The appearance there will come at a time when abundance may be somewhat reduced on Georges Bank.

Landings of cod in 1965 were about 30 million pounds, down from the 32 million pounds landed in 1964. This was due to decreased fishing since the abundance index for cod in the areas fished was the same in 1965 as in 1964. In 1966 the abundance is expected to hold steady.

Yellowtail flounder have been unusually abundant in recent years. Landings reached a peak of 79 million pounds in 1964. In 1965 the landings dropped to 76.5 million pounds. The incoming year-classes appear to be smaller than in recent years so that abundance is expected to drop somewhat further in 1966.

United States landings of whiting (silver hake) dropped sharply from the 87 million

pounds landed in 1964 to 76 million pounds in 1965. Both U. S. and Soviet fishermen fished for that species. The Soviets fished Georges Bank while U. S. fishermen fished primarily other areas such as along the Maine Coast, in Cape Cod Bay, and off Nauset. Abundance in those latter areas in 1965 was lower than in 1964 and there is no reason to believe the situation will improve significantly in 1966.

Ocean perch (redfish) landings in the United States in 1965 totaled about 80 million pounds--down from the 89 million pounds landed in 1964, and the lowest since 1939. The drop was due to a poor market for that species as abundance increased in all areas normally fished by U. S. fishermen, from the Gulf of Maine to the Grand Bank of Newfoundland. Abundance of that species in 1966 is expected to continue to increase over the 1965 level.

United States landings of sea scallop meats in 1965 totaled about 19.5 million pounds as compared with 15.5 million pounds in 1964. Abundance of sea scallops on Georges Bank, the principal fishing grounds, has declined in recent years, but total landings were maintained in 1965 by diversion of some effort to the Middle Atlantic grounds. Abundance on Georges Bank during 1966 is expected to hold at the 1965 level or slightly below.



North Atlantic

SOVIET FISHING ACTIVITY OFF COAST, JANUARY 1966:

There was a substantial increase in Soviet fishing activity in the Northwest Atlantic dur-



Fig. 1 - Soviet tug Sterequshchii making repairs to Soviet trawler Perekop in Cape Cod Bay.

ing January 1966. A sizable fleet of large conventional side trawlers returned to Georges Bank from U.S.S.R. ports and from other fishing areas. Several processing vessels of recent construction were also observed.



Fig. 2 - Departing Soviet trawler Perekop after completion of inspection by U. S. Government employees.

In all, a total of 49 vessels were sighted and identified as 24 fish-factory stern trawlers, 5 processing and refrigerated freezer stern trawlers, 16 large refrigerated side trawlers, 2 fish transports, and 2 fuel and water carriers.

The Soviet vessel observations were made by the staff of the Fisheries Resource Management Office, U. S. Bureau of Commercial Fisheries, Gloucester, Mass., which conducts reconnaissance flights cooperatively with the U. S. Coast Guard.

Despite severe weather conditions which prevailed during most of the month, the majority of the vessels were actively fishing. The vessels were divided into small groups and were widely dispersed from south of Montauk Point, Long Island, eastward along the 100-fathom curve of the Continental Shelf to the southeast part of Georges Bank.

The factory stern trawlers were operating primarily in areas ranging from 60 miles south of Block Island to 30-40 miles south and southeast of the Nantucket Lightship. Heavy to moderate catches of fish on deck and in the trawls appeared to be primarily red hake and whiting, with undetermined quantities of haddock. The Soviets had much success in fishing for red hake in those general areas commencing about this time in 1965.

Large refrigerated side trawlers, several support vessels, and one large factory base ship were operating on the southeast part of Georges Bank 100 miles southeast of Cape Cod. The heavy catches of fish appeared to be mostly haddock, with lesser amounts of whiting. Crews on deck were dressing fish which are bagged in sections of netting and transferred to a nearby processing ship.

The southeast part of Georges Bank has been an extremely productive area for scrod haddock and was fished almost entirely by the U. S. fleet during 1965.

At the end of January there were only a limited number of Soviet vessels operating off the eastern Nova Scotia areas.



Fig. 3 - U.S. Government fishery resource management official inspecting section of netting on board Soviet trawler Perekop during boarding in Cape Cod Bay.

The Soviet salvage tug Steregushchii towed the Perekop (a 229-foot, 658-gross ton, steam-driven, conventional side trawler) into shelter of Cape Cod Bay in order to make emergency repairs. The vessels were boarded by U. S. Government employees.



North Atlantic Fisheries Explorations and Gear Development

SURF CLAM SURVEY CONTINUED:

M/V "Delaware" Cruise 65-10 (September 10-November 24, 1965): Continuation of an Atlantic surf clam survey conducted during the summer of 1963 and 1964 was the purpose of this cruise by the U. S. Bureau of Commercial Fisheries Exploratory fishing vessel

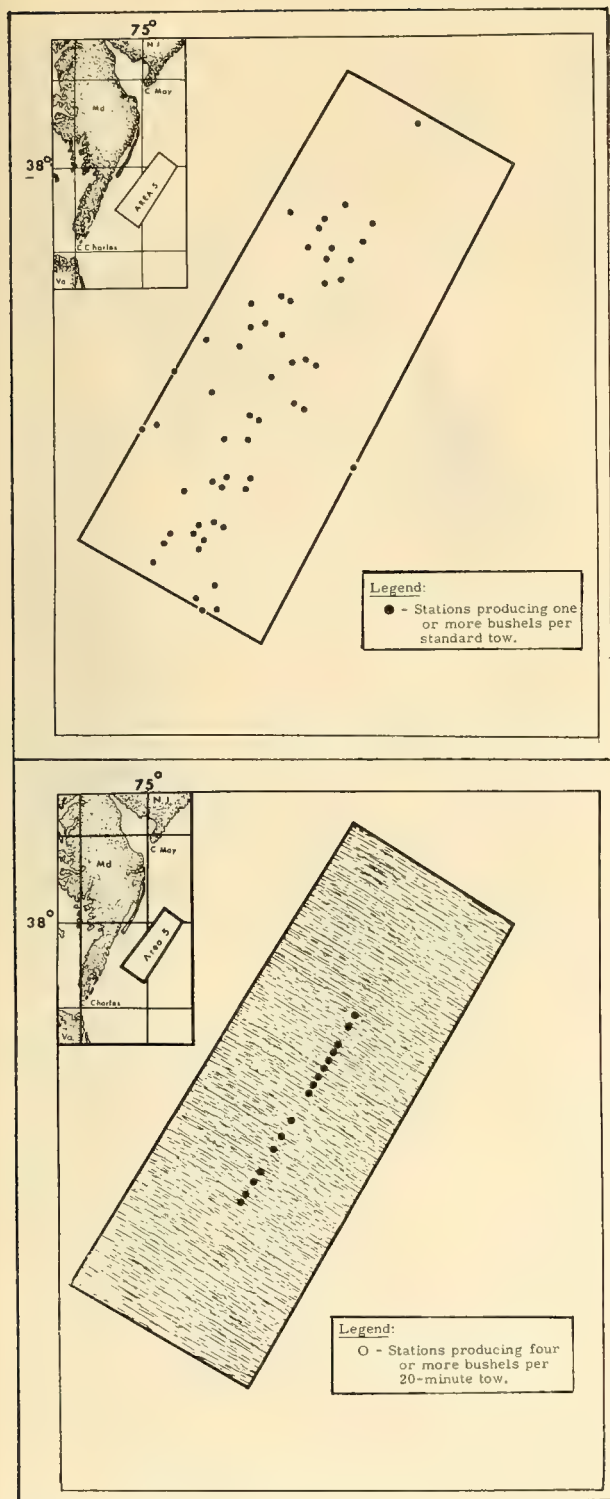


Fig. 1 - Surf clam Area V and producing stations during M/V Delaware Cruise 65-10 (September 10-November 24, 1965).

Delaware off the coasts of Maryland and Virginia. The survey was initiated in cooperation with the Sea Clam Packers Committee of the Oyster Institute of North America.

The remaining unexplored section of Area V and most of the unexplored sections of Area VI were completed. Of the 716 stations occupied, 194 tows were made where the catches of surf clams from the standard 4-mile tow equaled up to 3.6 bushels. The 53 commercial-length tows yielded up to 16.3 bushels in 20-minutes.

SURVEY PROCEDURES: The same procedure was used as that of past clam surveys. At each intersection of one-mile spaced grid lines, samples were taken by dredging the bottom with a 48-inch hydraulic dredge. Dredging was continued for 4 or 2 minutes depending upon the type of bottom soil in the towing area. To obtain commercial-size samples, tows of 20 minutes were made continuously along a selected grid line in Area V. This was done by returning the dredge to the bottom after each tow and fishing it without intervals of nondredging between stations.

All stations surveyed in Area VI, except for several made along the central part of the first four inshore grid lines, were in the southeast quadrant of the area. The section just north of this quadrant was bypassed because of danger from unexploded mines in the area.

Isolated stations in area V that were bypassed in previous surveys, in addition to grid lines 13, 14, 15, 16, 17 and 18, were completed by the end of the cruise. That completes the planned survey work in Area V.

SURF CLAM CATCHES: Of the 663 standard tows conducted during the cruise in both areas, the catch from 18 equaled or exceeded one-quarter bushel per minute of towing time and included a maximum catch rate of 0.9 bushels per minute. Of the 645 remaining tows, 250 of them yielded from 1 clam to 1 bushel. The remaining 395 tows yielded no clams. In the commercial group (53 tows), 16 tows yielded catches of 4 or more bushels per 20 minutes of towing time. One sample of the 53 contained no clams, leaving 36 tows where the catch varied from a few clams to 4 bushels. A higher percentage of zero catches was made during this cruise than previous cruises in the two areas; about half of the sur-

vey work was carried out near positions where poor results were obtained previously.

The best concentrations of surf clams were found in the southeast quadrant of Area VI. Larger catches were made at the northeast part of that quadrant and few clams were taken elsewhere in Area VI. No new beds were found in Area V where the population of surf clams was large enough to be significant for commercial utilization. Only 2 stations, one each on grid lines 1 and 18, of Area V yielded catches equal to one-quarter bushel per minute of towing time. Stations surveyed along the inshore grid lines of both areas yielded poor catches (similar to those taken previously in the same general location). Results from the offshore grid lines were about the same as those of the previous cruises--where depth of water exceeded 20 fathoms, few or no surf clams were found. In the commercial towing section of Area V, the best catches were made along the section of grid line 10 lying between Loran bearing 1H4-2629 and 1H4-2862. It was there, along grid line 10, that good catches of surf clams were taken during cruise 65-2 in standard 4-minute survey tows. Those results validate the 4-minute tow as a resource-assessment method.

Throughout all sections surveyed, the size and occurrence of the catches varied with the type of bottom. Best results were obtained where the bottom was coarse sand, gravel, or a combination of both. Tows made on soft or rocky bottom did not yield as good results as other bottom types. It was noted that poor catches were made in what was considered good bottom soils.

Water depth is a factor to consider in the analysis of the catch. The best catches were made in depths of 16 to 20 fathoms in agreement with previous findings. A small number of good catches was made in shallower water. The commercial-length tows showed the same relationship. The shallow waters below 16 fathoms and deep waters below 20 fathoms yielded poor results.

SIZE OF SURF CLAMS: All sizes of surf clams, except those which are too small for the dredge to retain, were taken during the cruise. As found for all previously surveyed sections, the predominant size group was 5 to 7 inches and larger. In the southeast quadrant of Area VI, the proportion of clams in

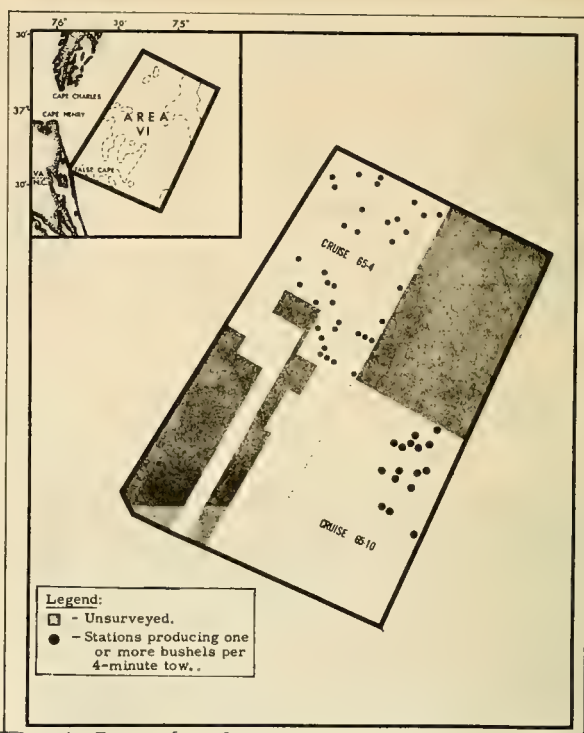


Fig. 2 - Surf clam Area VI and producing stations during M/V Delaware Cruises 65-4 and 65-10 (September 10-November 24, 1965).

the 6- to 7-inch group was greater than obtained previously in all areas surveyed. Because of the predominance of this size group, the average catch of medium and small surf clams was smaller from this quadrant than from other sections of the area.

This group-size relationship was noted in the commercial-scale catches of Area V. The predominant size of clams were five inches or over. In nearly all tows, however, a few medium clams were found mixed with the larger clams; in one tow they made up the bulk of the catch.

Surf clams shells and other shellfish species common to the area were taken at most of the survey sites. The abundance of shells varied considerably throughout each section surveyed. In the southeast quadrant of Area VI, the quantity of shells taken in many tows was larger than from other sections. Shells in great numbers were present in most of the productive tows. Few tows consisted mainly of pure live surf clams. Considerable numbers of shells were present in all but a few tows made in the commercial-sampling area.

BLACK QUAHOGS: Black quahogs were found at many scattered sites throughout Area VI, but not in large quantities equal to those found in other areas. Good catches were made along the offshore grid lines where the depth of water exceeded 24 fathoms in Area V. This depth relationship is about the same as was found during other cruises. During the commercial-length tows, few black quahogs were taken in any of the tows, this probably was due mainly to the depth factor.

Note: See Commercial Fisheries Review, September 1965 p. 34, for report on Cruise 65-4.

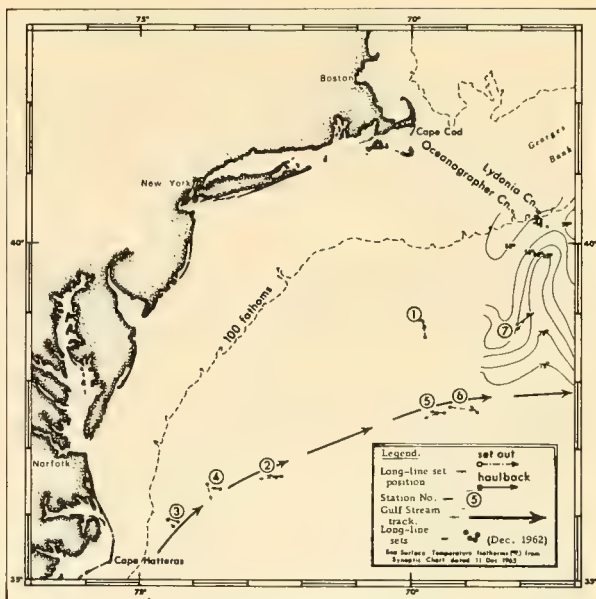
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TUNA AND SWORDFISH EXPLORATIONS IN NORTHWEST ATLANTIC CONTINUED:

M/V "Delaware" Cruise 65-13 (December 2-13, 1965): Explorations for tuna and swordfish south of Georges Bank and east of Cape Hatteras were continued during this 12-day cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Delaware. Primary objectives were to: (1) continue surveying the distribution and abundance of tuna in the Northwestern Atlantic, (2) investigate availability of swordfish beyond present commercial fishery areas, and (3) examine the relationship of thermal environment to availability of tuna and swordfish. Exploration in December 1965 included 16 long-line sets southeast of Georges Bank with good catches of swordfish and bluefin tuna, and small catches of big-eyed and albacore tuna. This information clarifies and enlarges the seasonal distribution picture for swordfish, yellowfin, big-eyed, and albacore tuna. Fishing results and thermal environment data obtained gave good indications of swordfish concentrations off Oceanographer and Lydonia Canyons.

LONG-LINE SETS AND CATCH: Three sets of long-line gear were fished during daylight hours and 4 sets were made from night into day periods. Units of mainline were 220-fathoms long with hooks spaced every 20 fathoms on 5-fathom branchlines. Each 10-hook unit was buoyed from the surface with a 5-, 10- or 20-fathom line. Squid and herring bait was used alternately on every other unit.

Fifteen small yellowfin tuna (Thunnus albacares) were caught at 2 stations (5 and 6) having the highest surface temperatures--size range 20 to 32 pounds (round). Five yellowfin were shark damaged. Catch rates were low (1.0 and 1.5 fish per 100 hooks) and did not indicate concentrations. Small school



Station pattern of M/V Delaware Cruise 65-13 (Dec. 2-13, 1965).

tuna (thought to be yellowfin) were observed surfacing alongside and in the vessel's wake during a 20-minute haulback period at Station 6. With the exception of 1 big-eyed tuna (Thunnus obesus) weighing 19½ pounds (round), the weight range was 60 to 186 pounds and the average was 125 pounds. One albacore (Thunnus alalunga) weighing 28 pounds was caught at Station 7.

Nine of the 11 swordfish (Xiphias gladius) caught on long-line gear were at Stations 6 and 7. Average size of the fish was 83 pounds ranging from 24 to 135 pounds. Two larval swordfish were taken in a surface plankton net at Station 5. Other noteworthy long-line catches included 2 blue marlin (Makaira nigricans), 1 opah (Lampris regius), and 4 gempylids (Lepidocybium flavo-brunneum).

ENVIRONMENTAL RELATIONSHIPS:

Thermal data used during the cruise were: (1) synoptic sea surface temperature isotherm and layer-depth isopleth data received from the U. S. Naval Oceanographic Office by radio-facsimile equipment aboard the vessel, (2) continuous sea surface temperature recordings, and (3) vertical (subsurface) temperature profile data obtained with bathythermograph (BT) equipment. Current observations were made from speed and direction of gear drift during fishing periods.

Analysis of thermal, current, and catch data indicates that big-eyed and yellowfin tuna were closely associated with the Gulf Stream--big-eyed were found in cooler, thin, mixed layers near the edges of the Stream (Stations 2-4), and yellowfin were found in warmer, deep, mixed layer near the core of the Stream (Stations 5 and 6).

Swordfish caught on long-line gear doubled from Station 6 to 7 and the surface temperature gradient was negligible, with subsurface thermal structure showing a homothermal layer to about 55 fathoms. The mean temperature at Station 7 was 8.3° F. lower than Station 6. Station 7 location was selected from the synoptic sea surface temperature chart of December 11, 1965, which showed a "tongue" of warm water extending north from the Gulf Stream to the area south of Oceanographer and Lydonia Canyons. A set further to the north, at the end of the "tongue" and bordering on colder water, was cancelled out by bad weather. A bathythermograph (BT) transect of the northwestern edge of the "tongue" indicated a complex subsurface temperature structure with underlying layers of warmer water. Similar structures in that area were noted in December 1962 when Woods Hole Oceanographic Institution's exploratory long-line catch rates averaged 7.9 swordfish per 100 hooks over nine sets. North of the area (500 fathoms in Oceanographer Canyon) the vessel ran through surface schools of saury (*Scomberesox saurus*) for two hours with the same bait noted in the stomach contents of swordfish taken at Station 7. No fishing vessels were seen in that area.

FISHING DEPTH OF LONG-LING GEAR: Depth of the center of the mainline curve (catenary) between buoylines (220 fathoms apart) was examined using 500-foot bathythermograph recorders with 12-hour clocks. Records made by those instruments revealed greater fishing depth of the gear than expected. Long-line sets, in general, fished deeper near the ends of the gear. During most sets the gear did not fish at a constant depth but slowly descended until hauled. The effect of current upon gear depth caused radical variations. Preliminary review of the recordings suggests that buoyline length has less effect on long-line fishing depth than distance between buoys and current velocity.

OTHER ACCOMPLISHMENTS AND OBSERVATIONS: In cooperation with the Woods

Hole Oceanographic Institution and the Shark Research Panel of the American Institute of Biological Sciences, 2 big-eyed tuna, 1 blue marlin, and 68 sharks were tagged and released. Physiological (body temperature regulation) data were collected on big-eyed and yellowfin tuna, swordfish, blue marlin, mako and silky sharks by personnel from the Woods Hole Oceanographic Institution. Ten experimental semiautomatic branchline clips were successfully tested for manual application in the fishing operation.

Note: See Commercial Fisheries Review, Nov. 1965 p. 27.



Oregon

WILLAMETTE RIVER SILVER SALMON COUNT RESUMED IN 1965:

Counts of adult silver salmon passing over Willamette Falls during the 1965 season were 47 percent greater than the previous high recorded in 1957, according to the Oregon Fish Commission. The run size calculation is based on actual counts of fish passing through the old Willamette Falls ladder during sample periods. This figure is then expanded to cover a full 24-hour day. On this basis, the 1965 run was calculated to total 10,300 silver or coho salmon, consisting of 7,800 3-year-olds and 2,500 2-year-olds or jacks.

Counting of the Willamette River silver salmon run was first started during the 1954 season and it continued through 1960. The counting was done each of those years during identical daily, 8-hour, daylight periods when the silver salmon were in the river. Lack of funds for the program precluded counting activities during the 1961-64 period. In 1965, with Columbia River Fishery Development Program funds provided through the U. S. Bureau of Commercial Fisheries, an extensive, one-year silver salmon counting project was set up at the falls. It is hoped a continuing program can be financed which will provide a basis for evaluating the efficiency of the proposed \$2.2 million Willamette Falls fishway in passing the runs of silver salmon into Willamette system.

Because of extremely low flows during the upriver migration period during the fall of 1965, temporary repairs to the existing ladder were required to enable silver salmon to use the facility. Counting began on September 2 and continued through December 20, with the

peak movement observed during October 22-27.

The total 1965 run figure is not readily comparable with figures obtained in earlier years since the season's activities were much more intensive. The best comparison under these circumstances is obtained by considering counts made in 1965 during exactly the same 8-hour, daylight periods that counting was conducted in the 1954-1960 years. On this basis the 8-hour count shows 4,360 3-year-old silver salmon for the 1965 season compared with the previous high of 2,950 adults in 1957. The 7-year average for the 1954-60 period was 1,311 adult fish.

The counts of early maturing male fish that return at two years of age have been higher in former years but this group of fish has little effect on the production of silver salmon from the river above the barrier. However, the size of 2-year-old returns is often an indication of the magnitude of the run of 3-year-old adults expected in the following year.

The greater numbers of silver salmon in the Willamette run appear to reflect increased Oregon Fish Commission efforts in introducing both fingerling and fry silver salmon into various Willamette tributaries. In the last two years adult fish, surplus to Fish Commission hatcheries, have been transplanted in order to help realize the potential for that species in the Willamette system. Success of these introductions gives grounds for considerable optimism over the possibility for developing a large run of silver salmon in the Willamette River when the much-discussed Willamette Falls fish ladder becomes a reality. Construction of the huge ladder will get underway early this spring when the troublesome cul-de-sac portion at the west end of the falls is started. Fishery biologists believe that eventual completion of the project could raise the potential anadromous fish escapements above the falls of the Willamette River to as high as 285,000 salmon and steelhead, some 90,000 of which would consist of silver salmon. Such dramatic increases in production would bode well for the future success of sportsmen and commercial fishermen alike.



Salmon

FISH FOOD CONTRACT AWARDED

Over 37 million young salmon and steelhead being raised in 15 Oregon Fish Commission hatcheries will enjoy a balanced diet through 1966. Recently a quarter-million-dollar fish pellet contract was awarded to an Astoria area firm by the Oregon State Department of Finance and Administration. The successful bidder on the 1.8-million-pound order will receive \$252,252 for the completed shipments of the specialized fish food.

Specifications require adherence to a precise formula and involve the manufacture of pellets varying from $\frac{1}{32}$ of an inch to $\frac{1}{8}$ of an inch in size. Seventy-seven deliveries of 24,000 pounds apiece are specified by the contract and they are scheduled over the season to 8 key hatcheries in the State. The U.S. Fish and Wildlife Service, Washington Department of Fisheries, Washington Department of Game, Idaho Department of Fish and Game, and the Oregon Game Commission have also placed substantial orders with the same firm in past years. Over 7 million pounds of the specialized fish food will be used this year in the 3 Northwest States.

The pellet was developed jointly by Oregon State University and Oregon Fish Commission scientists and has since become the predominant diet fed to hatchery-produced salmon in the Northwest. Increasing numbers of steelhead trout are also being switched to the pellet. The ration is a pelletized fish food which was developed to best utilize both the nutrition and cost benefits available in fresh fishery waste products. These are combined with dry ingredients to produce a food that has from 30 to 35 percent moisture content. The pellet presently being fed shows excellent nutritional advantages as well as being readily acceptable to the young fish. An additional advantage lies in being able to combine drugs or antibiotics into the pellet during manufacture, thus allowing treatment of disease as a part of the regular diet when needed.

Along with improved hatchery techniques in general, the pellet has had a profound influence on the ability of hatcheries to produce dramatic returns of silver or coho salmon and thereby greatly supplement the runs of this species which are harvested by sportsmen and commercial fishermen alike.



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, OCTOBER-DECEMBER 1965:

A report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for October-December 1965, follows:

Oyster Studies: A State-Federal deep-water oyster project surveyed 27 lineal miles of creeks and rivers locating existing and potential oyster beds. A small planting of seed oysters from the Wando River was moved to deep water in the Toogoodoo River where somewhat comparable hydrographic conditions existed. Inspection of those oysters three months later showed that survival was good and new growth fair among these transplanted seed. A second and larger transplant was made to two other areas during the last quarter of 1965.

Oyster studies programmed under special funds from the South Carolina Wildlife Commission made progress, particularly in the inventory work. Almost complete data has been gathered on the general physical environment, the quantity and quality of oysters in the Leadon River system. Tentative information indicates that this river system is producing about 10,000 to 15,000 bushels of oysters annually from 1,396 acres of marsh lands and 408 acres of oyster bottoms and tidal flats. With these basic data and by repeating the sampling of the oysters themselves throughout the year and throughout the years, the overall pattern of oyster conditions will become known. Considerable work of a similar nature has been carried on in the Ashepoo River system. Information extending back to 1936 for some areas in South Carolina was being sorted and assembled so that surveys of the same areas can be made now for comparison with the earlier surveys.

Pesticides: Sampling at the previously established monitoring stations continued on a monthly basis during the quarter. Fish and oyster samples from the Ashley River continued to produce DDT residuals in concentrations above the levels of samples from other areas. During November 1965, the DDT residuals of both fish and oyster samples from this area were the highest recorded so far--0.051 and 0.028 p.p.m., respectively. Dieldrin at 0.014 was recorded for the first time at the same station. As a whole, at all

stations, the residual levels of DDT and Dieldrin have been on a general increase since August 1965.

Bears Bluff Laboratories is extending its cooperative investigation on pesticides with the U. S. Bureau of Commercial Fisheries Laboratory at Gulf Breeze, Fla. Each month, fresh and quick frozen fish are shipped to Florida for analysis on the amount of Acetylcholinesterase (AChE) to determine the amount of organo-phosphate pollution.

Crab Studies: Studies on the blue crab, authorized with special funds from the South Carolina Wildlife Resources Commission, have been somewhat slow in getting underway as far as field work is concerned. The compiling and assembling of the catch per unit of effort by experimental trawls at some 20 stations from 1953 through 1965 has been completed. The purchase and assembly of the necessary gear and equipment for field work is well underway, and field work was scheduled to begin shortly after the first of the year. One set of studies to be emphasized will be to compare the catch per unit of effort by crab pots and by trawls in the vicinity of Murrells Inlet, S. C., where no commercial crabbing and no commercial trawling for shrimp or crabs takes place. Similar data will be gathered from the area in the vicinity of Price Inlet, which annually supplies one-tenth of the crab crop of the State, and where shrimp trawling is carried on offshore from June through mid-December. Data from those areas will be compared with similar information gathered in the same manner from the vicinity of Hunting Island in Beaufort County, an area which is intensely trawled for crabs and shrimp, and where commercial crabbing is carried on throughout the year. It is hoped that after at least a year's study of the kind outlined, some indication will be obtained of the effect of trawling for crabs and shrimp, and the commercial harvesting of crabs, on the crab population.

Shrimp Studies: White shrimp were about three times more abundant in experimental trawling operations during October-December 1965 as in the same quarter of the two previous years (table). Earlier in 1965, largely on the basis of data from experimental trawling and plankton tows, Bears Bluff predicted that the crop of white shrimp for 1965 would be markedly improved. Commercial landings through December show that the catch for the year was over 7 million pounds.

Cooler weather in December forced small shrimp out of the shallow waters and into the deeper areas of the river mouths and sounds. If water temperatures during the early months of 1966 do not drop too low, those shrimp should winter-over and produce a good population of roe shrimp in the spring of 1966.

The majority of the brown shrimp left inside waters comparatively early in 1965, possibly as a result of heavy competition with the very abundant white shrimp. During October through December, brown shrimp were almost nonexistent in experimental trawling operations. A few postlarval brown shrimp began to appear in plankton samples in late November and December, indicating that some spawning had already begun offshore, but no significant recruitment of those postlarvae will probably occur until February 1966.

Average Catch Per Unit of Effort of Various Species at 18 Regular Survey Stations, October-December 1963-65.

Year	Croaker	Spot	Blue Crabs		Shrimp	
			Immature	Mature	Brown	White
1965	2.0	6.8	4.2	9.9	0.2	138.1
1964	13.7	18.5	16.2	9.5	1.4	39.8
1963	13.1	39.9	17.5	21.5	1.0	40.0

The table shows the considerable decline in abundance of croaker, spot, mature and immature blue crabs, and brown shrimp during the quarter as compared to the same period in 1963 and 1964.

Pond Cultivation: Several experimental ponds at Bears Bluff Laboratories were drained and harvested during October 1965. Results were good. In one experiment, a one-acre pond, which had been stocked during May-August 1965 with postlarval and juvenile white and brown shrimp, yielded about 220 pounds of shrimp when drained on October 15. The pond had been stocked heavily with over 18,000 shrimp which were fed about 600 pounds of chopped fish, crab, and commercial fish food during the culture period. Mortality was low in this experiment, particularly among the white shrimp, and about 14,500 (80 percent of those stocked) were harvested when the pond was drained. The pond was treated with rotenone twice to remove fish; crab pots were used to control crabs.

The size of the shrimp harvested were small, indicating that under the existing conditions of food and living space, stocking had been too heavy for maximum growth to take place.

A small one-tenth acre pond was drained on October 22, 1965, and a harvest which was equivalent to 250 pounds per acre was obtained. The pond had been stocked with 1,200 juvenile white shrimp in June and July. In June the pond had been previously drained and harvested for brown shrimp stocked earlier in the year. The total yield for the year for both species was equivalent to about 325 pounds to the acre.

Experiments testing the effects of superphosphate fertilizer on shrimp pond production were begun in December 1965, using several heated concrete tanks and a one-acre pond as well. It is well known that added phosphate can greatly increase productivity in fresh-water fish ponds, but little is known about the effects of such fertilizers in salt-water impoundments.

Note: See Commercial Fisheries Review, September 1965 p. 44.



U. S. Foreign Trade

AIRBORNE IMPORTS OF FISHERY
PRODUCTS, JANUARY-SEPTEMBER 1965:

Shrimp from Venezuela continued to be the main airborne fishery import into the

U. S. 1/Airborne Imports of Fishery Products, July-Sept, 1965 and January-September 1965 with Comparisons						
Product and Origin 2/	July-Sept, 1965		Jan.-Sept, 1965		Jan.-Sept, 1964	
	Qty. 3/	Value 4/	Qty. 3/	Value 4/	Qty. 3/	Value 4/
	<u>1,000</u>	<u>US\$</u>	<u>1,000</u>	<u>US\$</u>	<u>1,000</u>	<u>US\$</u>
	<u>Lbs.</u>	<u>1,000</u>	<u>Lbs.</u>	<u>1,000</u>	<u>Lbs.</u>	<u>1,000</u>
Fish:						
All countries . .	181.0	171.0	662.7	651.2	356.4	104.1
Shrimp:						
Venezuela. . . .	1,112.9	592.1	8,831.2	4,518.6	4,671.2	2,202.4
Panama	223.0	161.6	815.4	532.5	812.8	499.1
Costa Rica . . .	-	-	104.8	50.2	296.1	181.2
El Salvador. . .	-	-	28.1	19.1	159.1	96.8
Other countries	1.2	1.4	55.7	31.8	114.6	61.2
Total shrimp .	1,337.1	755.1	9,835.2	5,152.2	6,053.8	3,020.7
Shellfish other than shrimp:						
Canada	1.6	0.5	25.5	9.2	312.9	173.4
Mexico	7.5	8.9	8.7	9.9	14.4	9.9
British Honduras	94.9	125.4	171.1	182.9	207.3	165.5
Honduras	9.2	11.0	24.8	16.7	72.9	78.7
Nicaragua	5.4	3.0	109.5	115.0	50.5	40.0
Costa Rica	-	-	13.9	13.3	18.6	14.2
Jamaica	27.9	23.7	53.7	59.4	52.9	49.6
Other countries	37.5	42.5	146.7	119.7	54.5	24.4
Total shellfish (ex- cept shrimp)	184.0	215.0	553.9	526.1	784.0	555.7
Grand total . . .	1,702.1	1,141.1	11,051.8	6,329.5	7,194.2	3,680.5

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and trade between United States possessions are not included.

2/When the country of origin is not known, the country of shipment is shown.

3/Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.

4/F.O.B. point of shipment. Does not include U.S. import duties, air freight, or insurance.

Note: These data are included in the overall import figures for total imports, i.e., these imports are not to be added to other import data published.

Source: United States Exports & Imports by Air, FT 785, January through September 1965, U.S.

1/Imports into Puerto Rico from foreign countries are considered to be United States imports and are included. But United States trade with Puerto Rico and with United States possessions and territories and United States possessions are not included.

2/When the country of origin is not known, the country of shipment is shown.

3/ Gross weight of shipments, including the weight of containers, wrappings, crates, and moisture content.

4/F.o.b. point of shipment. Does not include U.S. import duties, air freight, or insurance.
Note: These data are included in the overall import figures for total imports, i.e., these im-

Source: United States Exports & Imports by Air, FT 785, January through September 1965, U.S. Bureau of the Census.

United States during the third quarter of 1965. In January-September 1965, airborne imports of fishery products into the United States totaled 11.1 million pounds with a value of \$6.3 million. Airborne fishery imports increased 53.6 percent in January-September 1965 as compared with the same period in 1964 when smaller quantities of shrimp were shipped by air from Venezuela.

The data as issued do not show the state of all products--fresh, frozen, or canned--but it is believed that the bulk of the airborne imports consisted of fresh and frozen products.

* * * * *

IMPORTS OF CANNED TUNA UNDER QUOTA:

United States imports of tuna canned in brine during January 1-December 31, 1965, amounted to 49,203,807 pounds (about 2,343,038 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was a decrease of 7.0 percent from the 52,930,989 pounds (about 2,520,523 standard cases) imported during January 1-December 31, 1964.

The quantity of tuna canned in brine which could be imported into the United States during the calendar year 1965 at the 12½-percent rate of duty was limited to 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota would have been dutiable at 25 percent ad valorem.



Virginia

MARINE SCIENCE SUMMER TRAINING PROGRAM FOR HIGH SCHOOL STUDENTS:

The National Science Foundation has granted \$8,500 to the Virginia Institute of Marine Science, Gloucester Point, Va., to operate a special class in marine science at a Norfolk, Va., High School during the summer of 1966.

The Institute has cooperated with the Norfolk school officials for the past four summers in presenting special courses in marine science to challenge exceptional secondary school students to higher achievement scholastically and to introduce them to the fascinating study of marine environment.

During those years 60 students and 10 high school teachers have participated in lectures, laboratory studies, and field work. They have studied ecological areas at ocean beaches, Eastern Shore, Gloucester Point, and other localities in tidewater Virginia. The program in marine science will be expanded this summer to accommodate 30 students rather than the 15 enrolled in previous summers. Five students are selected each year from other schools in Continental United States.

The outstanding feature of this program is the special ecological study conducted by students and teachers in the field. About two days each week are spent visiting various marine habitats and studying the marine plants and animals associated with them.

The program is to encourage capable young people to consider the possibilities of a career in marine science.

Note: See *Commercial Fisheries Review*, March 1965 p. 57, February 1965 p. 45.



Washington

EVALUATION OF COST AND PRODUCTION OF FISH FARMS:

An evaluation of the cost and production of each fish farm operated by the Department of Fisheries has been completed. The evaluation enables the Department to judge the worth of the fish farms in terms of salmon produced compared to the cost of construction, maintenance and operations.

Fish farms which have been found to be the best producers are being turned over to the Hatchery Division for operation.

Several areas will be retained by the Research and Management Division. In those ponds, experiments will be continued aimed at increasing the production and survival of fish-farm salmon. Techniques enabling high production of good quality young salmon in fish farms at a reasonable cost have yet to be found. Until better methods are devised, the main emphasis in artificial rearing will be the present hatchery system.

Several fish farms now considered borderline may prove valuable in future years. These will be deactivated and held in reserve.

Anderson Lake, Heines Lake, and Maylor Lagoon will be abandoned. Black Lake may be abandoned or planted only every other year due to residualism of young silver salmon in that lake.

The change in program and lack of funds makes it necessary to eliminate four positions in the Research and Management Division. The permanent fish farm staff of 3 biologists and 3 hatchery men will be reduced to 2 biologists. (Washington Department of Fisheries, January 19, 1966.)

Note: See Commercial Fisheries Review, October 1965 p. 58.



Weather

NEW RADIO BROADCAST NETWORK ESTABLISHED FOR MARINERS:

A network of 15 additional VHF radio stations, operating on a frequency of 162.55 megacycles, will be established by the Environmental Science Services Administration (ESSA), U. S. Department of Commerce, to provide mariners with continuous FM transmission of weather warnings, forecasts, and reports. The new radio stations will operate from ESSA's Weather Bureau offices along the Atlantic and Gulf coasts.

The stations, slated to be in operation before the start of the 1966 hurricane season next June, will be located at the ESSA Weather Bureau sites at Miami, Fla., Boston, Mass., Washington, D. C., Norfolk, Va., Atlantic City, N. J., Jacksonville, Fla., Charleston, S. C., Providence, R. I., Wilmington, N. C., New Orleans, La., Tampa, Fla., Lake Charles, La., and Brownsville, Galveston, and Corpus Christi, Tex. The Weather Bureau already operates continuous VHF broadcast stations in New York City, Chicago, and Kansas City.

Any craft carrying a suitable FM radio receiver within an approximate 40-mile radius of those cities will be able to receive the latest weather forecasts, warnings, and coastal station reports.

Weather bulletins will be prepared by Weather Bureau personnel and tape recorded. An automatic device will then replay the tape over the air. The taped message will be updated every three hours or more frequently during rapidly changing weather situations.

ESSA is a new agency of the U. S. Department of Commerce established in July 1965 to serve as a focus for national efforts to describe, understand, and predict man's natural environment. It includes the Weather Bureau, the Coast and Geodetic Survey, and the former Central Radio Propagation Laboratory of the National Bureau of Standards.



Wholesale Prices

EDIBLE FISH AND SHELLFISH, JANUARY 1966:

The January 1966 wholesale price index for edible fish and shellfish (fresh, frozen, and canned) at 124.5 percent of the 1957-58 average was up 4.4 percent from the previous month and 11.1 percent from the same month in 1965. The increase from December was due primarily to much higher fresh haddock prices at Boston caused by the short supply. In January this year, prices for most of the fishery products that make up the wholesale price index were higher than in the same month in 1965.



Draggers unloading at docks of New York City's Fulton Fish Market, Jan. 1966. (Brooklyn Bridge in background.)

January 1966 prices in the drawn, dressed, or whole finfish subgroup were unchanged from December 1965 for western halibut and salmon at New York City and whitefish at Chicago. There was a 5.6-percent increase in fresh yellow pike prices at New York and a 60-percent increase in large fresh haddock at Boston. The index for all items in this subgroup was much higher than a year ago.

Fresh processed fish and shellfish prices were at the same level as December except for an increase of 8.8 percent in fresh shrimp

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, January 1966 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			Jan. 1966	Dec. 1965	Jan. 1966	Dec. 1965	Nov. 1965	Jan. 1966
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					124.5	119.3	119.4	112.1
<u>Fresh & Frozen Fishery Products:</u>					127.7	120.6	122.7	118.3
<u>Drawn, Dressed, or Whole Finfish:</u>					138.3	123.4	128.5	121.8
Haddock, lge., offshore, drawn, fresh.	Boston	lb.	.24	.15	187.4	119.6	143.4	133.3
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.48	141.0	141.0	140.5	118.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.88	122.3	122.3	122.3	119.1
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.63	.63	93.3	93.3	85.8	90.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.75	.71	122.8	116.2	126.9	122.8
<u>Processed, Fresh (Fish & Shellfish):</u>					128.3	123.5	124.2	116.0
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.44	.44	105.7	105.7	115.4	134.8
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	.99	.91	116.0	106.6	106.6	109.6
Oysters, shucked, standards.	Norfolk	gal.	8.75	8.75	147.6	147.6	147.6	120.1
<u>Processed, Frozen (Fish & Shellfish):</u>					111.9	110.6	110.9	111.8
Fillets: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.40	.40	101.4	101.4	103.9	92.5
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	115.8	115.8	117.3	115.8
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	112.2	112.2	112.2	106.9
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.93	.91	110.3	107.9	107.3	112.1
<u>Canned Fishery Products:</u>					119.3	117.5	114.0	101.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.00	27.50	122.0	119.8	117.7	91.5
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.50	12.25	111.0	108.8	102.6	102.6
Mackerel, jack, Calif., No. 1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	128.3

1/ Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

prices at New York. Haddock fillets and shucked oysters were unchanged. Compared with the previous year, the January 1966 index of fresh processed items was higher for all products except small haddock fillets which were down 21.6 percent.

Frozen fillet prices in January 1966 were at the same level as the previous month and generally higher than in January 1965. The subgroup index for frozen processed fish and fillets was up slightly from December due to a small increase in large shrimp prices at Chicago. Compared with January 1965, the

current index was up very slightly but there was a mixed trend in the individual items.

The January 1966 subgroup index for canned fishery products rose 1.5 percent from the previous month. Prices for canned pink salmon and canned lightmeat tuna continued to climb while canned Maine sardines and California jack mackerel were unchanged. Prices for all items in this subgroup were much higher than a year ago and the index was up 17.2 percent. Stocks of canned pink salmon continued light, while the canned tuna market has tightened considerably.





International

FISH MEAL

WORLD PRODUCTION, OCTOBER 1965 WITH COMPARISONS:

World fish meal production in October 1965 was up 16 percent from the previous month, but down 38 percent from October 1964. Peruvian output showed some improvement in October 1965, but was still far below that in October 1964.

World Fish Meal Production by Countries, October 1965 with Comparisons				
Country	October		Jan.-Oct.	
	1965	1964	1965	1964
. (Metric Tons)				
Canada	7,404	4,927	72,203	44,623
Denmark	12,578	13,074	103,683	99,645
France	1,100	1,100	11,000	11,000
German Fed. Repub.	6,190	6,369	57,404	63,545
Netherlands	505	900	4,884	6,700
Spain	1/	1/	2/ 13,247	1/
Sweden	688	673	6,089	5,973
United Kingdom	6,633	5,584	66,669	63,807
United States	11,517	7,780	190,096	187,528
Angola	1/	5,402	3/ 29,019	47,475
Iceland	14,734	13,064	120,436	115,309
Norway	32,021	15,815	285,680	162,630
Peru	41,463	130,492	951,553	1,189,562
So. Afr. (including S.-W. Afr.)	6,375	15,855	267,824	246,928
Belgium	375	375	3,750	3,750
Chile	885	10,743	52,581	124,979
Morocco	3,150	950	16,050	18,200
Total	145,618	233,103	2,252,168	2,391,654

1/ Data not available.

2/ Data available only for January-May 1965.

3/ Data available only for January-September 1965.

Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present.

World fish meal production in January-October 1965 was down about 6 percent from that in the first 10 months of 1964. Peruvian output was down 20 percent and Chilean production was also down sharply, but the decline was partly offset by increased production in Norway, Canada, and South Africa.

Most of the principal countries producing fish meal submit data to the International Association of Fish Meal Manufacturers monthly (see table).

* * * * *

PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, JANUARY-NOVEMBER 1965:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Exports of Fish Meal by Member Countries of the FEO, January-November 1965

Country	November		Jan.-Nov.	
	1965	1964	1965	1964
. (1,000 Metric Tons).				
Chile	1.7	12.4	62.1	127.2
Angola	1/	4.2	2/ 30.1	52.0
Iceland	14.6	10.9	118.3	111.8
Norway	32.0	14.4	234.8	169.1
Peru	38.8	109.7	1,161.1	1,292.7
So. Africa (including S.-W. Africa)	14.4	18.7	209.1	212.7
Total	101.5	170.3	1,815.5	1,965.5

Table 2 - Production of Fish Meal by Member Countries of the FEO, January-November 1965

Country	November		Jan.-Nov.	
	1965	1964	1965	1964
. (1,000 Metric Tons).				
Chile	1.9	9.6	54.4	134.6
Angola	1/	5.2	2/ 26.6	52.7
Iceland	30.9	3.2	151.4	118.5
Norway	19.3	13.1	305.0	175.8
Peru	116.7	181.7	1,068.3	1,371.6
So. Africa (including S.-W. Africa)	3.2	9.0	270.8	256.4
Total	172.0	221.8	1,876.5	2,109.6

1/ Data not available.

2/ Data available only for January-August 1965.

FOOD AND AGRICULTURE ORGANIZATION

NEW FISHERIES

DEPARTMENT ESTABLISHED:

The Fisheries Division of the Food and Agriculture Organization (FAO) became a Department, consisting of two divisions, on January 1, 1966.

The decision to enlarge FAO's work in fisheries was made by the Organization's biennial Conference held in late 1965. The Conference also decided to establish a per-

International (Contd.):

manent 30-nation committee on fisheries, whose principal tasks are to review and propose solutions for conservation problems of an international character, and to advise FAO on its fisheries programs and policies.

Roy I. Jackson of the United States was appointed Assistant Director-General to head the new FAO Fisheries Department. Jackson had been in charge of the FAO Fisheries Division since May 1964. From 1955 until his FAO appointment, he was Executive Director of the International North Pacific Fisheries Commission.

The new FAO Fisheries Department will initially comprise two divisions--a Fishery Resources and Exploitation Division and a Fishery Economics and Products Division. Present FAO plans, approved by the Conference, call for the Department to grow to four divisions between 1966 and 1972.

F. E. Popper of Canada has been appointed Director of Program Coordination and Operations for the new Fisheries Department, and will act as deputy to Jackson. Popper has served with FAO since 1954 and was Deputy Director of the Fisheries Division during 1962-1965.

R. W. Harrison of the United States was named Acting Director of the new Fishery Economics and Products Division. S. J. Holt of the United Kingdom was named Acting Director of the Fishery Resources and Exploitation Division. (Food and Agriculture Organization, Rome.)

NORTHEAST ATLANTIC FISHERIES
POLICING CONFERENCE

SECOND SESSION TO MEET IN LONDON:

The Northeast Atlantic Fisheries Policing Conference (NEAFPC) is scheduled to meet in London for its Second Session March 31-April 6, 1966. A technical committee meeting of the Conference is to be held at the start of the Second Session.

The NEAFPC grew out of a resolution adopted at the European Fisheries Conference (held in London, December 1963-March 1964), which called upon the United Kingdom to convene a conference to draw up a convention on rules of conduct for fishing vessels in the Northeast Atlantic.

The First Session of the NEAFPC met in London, April 6-9, 1965, and was attended by France, Germany, Italy, the Netherlands, Belgium, Denmark, Norway, Portugal, Swe-

den, the United Kingdom, Iceland, Ireland, Spain, the United States, Canada, Japan, Poland, and the U.S.S.R. (United States Embassy, London, January 12, 1966, February 5, 1965; and other sources.)

Note: See Commercial Fisheries Review, May 1964 p. 40.

SALMON

BALTIC SEA CONSERVATION AGREEMENT
BETWEEN DENMARK, SWEDEN,
AND WEST GERMANY RATIFIED:

The Baltic Sea Salmon Conservation Agreement between Denmark, Sweden, and West Germany was scheduled to go into effect March 1, 1966. Ratification of the agreement by all three countries was announced in January 1966. The agreement is reported to provide for:

(1) A minimum mesh size in drift gill nets of 165 mm. (6.5 inches) for natural fibers and 157 mm. (6.2 inches) for synthetic fibers, with a 5-year transition period for gear currently in use.

(2) A minimum width of 19 mm. (0.748 inches) between the point and shaft of hooks used in the long-line fishery.

(3) A minimum size of 60 cm. (23.6 inches) for salmon, measured from the tip of the snout to the extreme end of the tail.

Those salmon conservation measures in the agreement may also be placed in effect by the other Baltic Sea salmon fishing nations (U.S.S.R., Poland, and Finland), even though they did not ratify the agreement.

Salmon Catch in the Baltic Sea by Countries, 1963-1964		
Country	1/1964	1963
	(Metric Tons)	
Denmark	1,721	1,133
Finland	465	368
Germany	2/	180
Poland	357	335
Sweden	631	371
U.S.S.R.	235	200
1/Preliminary.		
2/Not available.		
Source: International Council for the Exploration of the Sea.		

There was a considerable increase in the Baltic Sea salmon catch in 1964. Preliminary estimates indicate that Denmark's 1965 Baltic Sea salmon catch will be about the same as in 1964. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, January 4, 1966, November 3, 1965, and September 15, 1965.)

Note: See Commercial Fisheries Review, Nov. 1965, p. 44.

International (Contd.):

INTERNATIONAL WHALING COMMISSION

ANTARCTIC WHALING
OPERATIONS, 1965/66:

Japan, U.S.S.R., and Norway are operating 10 whaling fleets in the 20th (1965/1966) Antarctic Whaling Expedition. This is a reduction of 5 fleets from the 19th (1964/1965) Expedition. Of the 10 fleets, 3 Japanese fishing companies have 5 fleets on the grounds instead of the 7 operated last year. The fleet reductions followed the action taken by the International Whaling Commission in reducing the international Antarctic whale catch from 8,000 blue-whale units (informally set by Antarctic whaling countries) for 1964/1965 to 4,500 blue-whale units for the 1965/1966 season.



Cutting up a whale for processing aboard a Japanese whaling factoryship in the Antarctic.

Japan's quota for the current year is 2,340 blue-whale units, 52 percent of the international quota. From the beginning of the baleen whaling season on December 15, 1965, to January 8, 1966, Japanese fleets landed 646 blue-whale units producing 11,376 tons of oil. The combined catch of the Antarctic whaling countries (Japan, U.S.S.R., Norway) during that period was 1,006 blue-whale units.

Current season hauls by the Japanese are significantly lower than during the same pe-

riod in 1964/1965. On January 9, 1965, the catch by 7 Japanese fleets amounted to 1,307 blue-whale units. On a per-fleet basis, the average Japanese catch this year is 129 blue-whale units as compared with 186 last year. The average catch per fleet of the combined fleet (all countries) this year is 100.6 blue-whale units against 136.7 last year. (U. S. Embassy, Tokyo, Japan, January 25, 1966.)

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BRAZIL TO WITHDRAW
FROM COMMISSION:

The Brazilian Government has informed the International Whaling Commission that it desires to withdraw from the Commission, effective June 30, 1966. The basis for the proposed withdrawal is not known at this time. (U. S. Embassy, Lima, Peru, January 8, 1966.)

**Argentina**FISHING INDUSTRY TRENDS,
1964 AND FIRST HALF OF 1965:

Catch and Production Highlights: The total Argentine fishery catch for 1964 was 160,306 metric tons. The 1964 sea catch of 143,587 tons was 30.1 percent higher than in 1963 and the fresh-water catch of 14,762 tons was 23.1 percent above the previous year.

During the first six months of 1965 the Argentine fishing fleets brought in 75,331 tons of fish, 6.8 percent above the catch for the corresponding period in 1964. The official estimate for 1965 is 15-20 percent above 1964. About 43 percent of that catch went to the canning, salting, freezing, and filleting plants, an increase of 4,045 tons over the same period in 1964; and about 45 percent went to the fish oil and meal processing plants.

The 1964 fresh and frozen fish fillet production of 20,986 tons practically doubled fillet production for 1963. It shows a continuing upward trend in 1965.

About 90 percent of the Argentine catch is delivered to the city of Mar del Plata which, due to location there of fish meal and fillet factories, is rapidly becoming the center of the Argentine fishing industry at the expense of other Argentine Atlantic coast ports.

Increased Imports: Argentina is using more of her fish catch internally and export-

Argentina (Contd.):

ing less. During 1964 Argentine exports of fish and products dropped to 4,585 tons from a 1963 level of 8,918 tons. Imports for 1964 rose to 4,746 tons from the 1963 level of 2,367 tons.

From January through June 1965 Argentina exported 1,798 tons of fish (610 tons of fresh, frozen, and canned fish, 657 tons of fish oil and 425 tons of fish meal). In the same period, she imported 10,741 tons of fish and products, including 8,140 tons of fish meal.

Fish Meal: In the first five months of 1965 Argentina was a net importer of 7,715 metric tons of fish meal. For the whole year of 1964 she was a net exporter of some 305 tons.

The development of production and trade in fish meal has accompanied the rapid expansion of pig and poultry farming in Argentina, and the increased use of fish meal as a protein additive in livestock feed. Argentine fish meal factories are working at peak capacity and should be able to reduce the high import level in 1966.

Internal Consumption: Total consumption of fish per person in Argentina rose in 1964 to 4.2 kilos (9.2 pounds), from 3.3 kilos (7.3 pounds) in 1963. Real consumption (fresh, frozen, canned) rose from 2.7 to 3.4 kilos (5.9 to 7.5 pounds). The trend continues up in 1965, but not quite so dramatically. There have been two beefless days per week in Argentina in an effort to release a part of national beef consumption for export; this is partly responsible for the increased fish consumption, and is also responsible for the increased use of fish meal as a feed additive in the expanding poultry and pig industry.

Fleet Shortage: In 1964 only one of the five existing fish oil and meal plants in the country was able to work at full capacity. This was due to a lack of fleet tonnage sufficient to provide large enough catches to operate the other four plants more than 8 to 12 hours a day.

The Argentine high-seas fleet consists of some 50 trawlers and the coastal and river fleet of some 350 launches and 27 boats. Seven high-seas trawlers with a total of 1,290

tons were added to the fleet in 1964 and 2 more large trawlers recently. Forty other fishing vessels of varying sizes are currently under construction under a Government-sponsored development program. The Argentine Government has assigned 2.0 billion pesos annually (about US\$10.5 million) to be loaned at 8 percent interest for the integrated development of the fishing fleet and fish processing capacity. Six firms have made proposals to the Government for loans to start integrated operations consisting of fishing vessels, filleting and freezing plants, and fish oil and meal factories.

One of the principal bottlenecks of the Argentine fishing industry at this juncture appears to be a lack of sufficient high-seas trawlers, and a need to better understand the fishing grounds off the Argentine coast. The Inter-American Bank has offered assistance to the Argentine fishing industry development program, but despite announced Government fishing industry assistance loan plans, difficulties are currently being encountered by the industry in finding peso credit to match the funds offered by the Bank for new construction.

Government Activities: The Government recently froze the retail price of fish for consumption on the local market. Subsidies which the fishing industry had been receiving for purchases of fuel also were recently withdrawn, but a new bill recommends reinstating them. Other recent decrees have granted an exemption from customs duties for machinery imports related to the fishing industry, and given permission for Latin America Free Trade Association (LAFTA) member country vessels to fish Argentine waters under certain restrictions.

The Argentine Senate late in 1965 passed and sent to the Chamber of Deputies a bill looking to rationalization and intensification of the Argentine fishing industry. Thirty years ago Argentina produced more fish and products than any other South American country; today she ranks fourth behind Peru, Chile, and Brazil.

A UN/FAO team is currently making preliminary studies here which it is hoped will lead to a \$3 million investment by those international organizations in Argentine fisheries research.

Under the auspices of FAO, Argentina, Brazil, and Uruguay have formed a regional

Argentina (Contd.):

commission for the study of fishing in the Southwestern Atlantic looking to coordinated regional development and exploitation of fishing resources.

Argentina is forming a National Institute for Fishery Studies to consist of members of the industry and interested government agencies.

Fish Meal and Fillet Freezing Plants:

One Argentine firm in Mar del Plata is a consortium of fishing-fleet operators and fish processors which markets fresh fish and produces fish oil and meal. Another Mar del Plata firm processes hake which it fillets, freezes, and exports, mostly to the United States (where it is sold as "Argentine whiting"). The two firms process the catch from 17 high-seas trawlers and numerous coastal launches; the plants of the two firms process some 60 percent of the total Argentine high-seas catch.

One of the firms employs some 400 women to cut and clean the hake and quick-freeze it for export. Some 80 percent of that firm's frozen fish fillets are exported to the United States and the firm has received market inquiries from South Africa, Australia, and Japan. Part of the high-seas hake catch processed by that firm is sold fresh, packed in shaved ice and trucked into the interior; another part is sold in Buenos Aires supermarkets, which are just now beginning to have sufficient display refrigeration cases to handle such products.

The firm's fish meal plant uses both coastal catch and the filleting waste in its production of fish meal; thereby using the total catch from the consortium's vessels. The firm's fish-meal processing plant, which operates with Danish equipment, is the only one of the five fish meal plants in Argentina which was able to purchase sufficient catch to operate continuously in 1964 (three 8-hour shifts, seven days a week).

Both the Mar del Plata plants are efficiently laid out, clean, and managed for maximum input of high-seas and coastal catch and maximum output of salable products.

A lack of plate-freezing equipment for processing fillets is holding back the expansion of the one firm. That firm is unable to

obtain the pesos needed for physical plant expansion to accommodate the proposed new freezing capacity.

Domestic demand for fish meal as a feed supplement, and international market demand for frozen fish fillets, appear practically unlimited. In 1964, one of the two firms had estimated that during 1965 he could sell some 21 million pesos worth of frozen fish fillets during the year; they have been selling 20 million pesos worth (about US\$100,000) each month. The firm estimates that when they are able to install four new plant freezers which they are currently seeking to finance, they will be able to increase their fillet-processing operation from 2 shifts a day to 3, and increase their sales of fillets to 50 million pesos (\$250,000) monthly.

These firms are believed to be representative to the extent that it can be said that the Argentine fishing industry urgently needs a large volume of new investment, both in ships and installations. (U. S. Embassy, Buenos Aires, Argentina, January 15, 1966.)

Note: 1 Argentine peso equals US\$0.005.



Brazil

SHRIMP SHIPPED TO UNITED STATES FROM NEW PROCESSING FIRM:

In Brazil, a modern fish-freezing and processing plant at São Sebastião, north of the city of São Paulo, made its first shipment of frozen shrimp to the United States, November 15, 1965. The shipment of 70 metric tons was packed according to U. S. specifications and destined for a New York firm.

The fish-processing plant at São Sebastião was 18 months under construction and represents an investment of Cr. 2.5 billion (US\$1.35 million), of which Cr. 1.3 billion (\$700,000) had been spent by late 1965. Present production capacity is estimated at 200 tons of frozen fish and 40 tons of salt fish a month. Danish and German ice-making equipment can produce 90 tons in 24 hours. The plant has a cold-storage capacity for 800 tons of ice and 1,900 tons of perishable products. The firm plans to supply ice to local fishermen, from whom it buys fish at a fixed price, and is said to need a supply of 50 tons of fish a day for a profitable operation. The future installation of modern unloading equipment and other im-

Brazil (Contd.):

provements at the port of São Sebastião is also considered essential to the success of the new fish-processing operation. (U. S. Embassy, Rio de Janeiro, December 16, 1965.)

Note: Brazilian cruzeiros 1,850 equal US\$1.00.

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TUNA FISHERY DEVELOPMENTS, 1965:

About 16 species of tuna and tuna-like fish have been caught off the northeastern Brazilian coast. Yellowfin (Thunnus albacares) is reported to have accounted for about 50 percent of the commercial tuna catch in those waters and albacore (T. alalunga) for about 25 percent. Fishing takes place between July and January in two of the three general fishing grounds for yellowfin: (1) the area extending from French Guiana to the mouth of the Amazon and (2) from Parnaíba to Fortaleza. In the other half of the year (February to June), fishing is concentrated between latitudes encompassed by Cabo São Roque and the mouth of the São Francisco River. Distribution of albacore extends to the south, substantial quantities having been fished between Cabo Frio and Santos. Further oceanographic studies are needed to establish tuna fishing areas and their yearly variations.

One large Japanese vessel, line-fishing on the high seas along the Brazilian coast, reported a daily catch of from 15 to 30 tons of tuna, with the weight of individual species ranging from 50 to 700 pounds.

A small variety of albacore ("albacorinha") frequents northeastern coastal waters during certain periods of the year. Although "albacorinha" has been observed at the mouth of the Rio São Francisco and at the entrance of Bahia harbor, it is fished on a commercial scale only off the coast of Rio Grande do Norte. The fishing is done by sail boats varying from 7.5 to 9 meters (24.6-29.5 feet) in length with a crew of 3 men using a single line.

Line fishing is the principal method for tuna fishing, although tuna have been captured with almost every type of gear used in Brazil.

The only specialized tuna vessels used in Brazil were those owned by the two Japanese companies operating in Brazil from Santos

and Recife, respectively. The firm out of Santos discontinued tuna fishing well over a year ago owing to problems encountered in training crews (two-thirds of which by law must be Brazilian citizens) and in maintaining the gear and vessels. According to officers of the company, high Brazilian production costs prevented them from competing in the international market. The firm's two long-liners were converted for use in general pelagic fishing operations. The firm out of Recife is understood to be operating one long-liner for tuna fishing, but to have encountered the same problems. Tuna is also caught in general fishing operations where other types of vessels are used. There are no present or prospective building programs for tuna vessels.

Shore-based facilities available for handling tuna consist of the general fishing depots (entrepôts) located at Fortaleza, Natal, Recife, Salvador, Rio de Janeiro, and Santos. All are badly in need of expansion and modernization of landing, handling, ice-making, and cold-storage facilities. There are innumerable plans for construction of such facilities, but progress in recent years has been negligible and, with the possible exception of SUDENE (Superintendency for the Development of the Northeast) financing for refrigerated warehouses in northeastern ports, there are no building programs for those facilities. There are no current technological developments in Brazilian tuna-handling methods.

Research on tunas is being carried out by SUDENE, by the Institute of Marine Biology at the University of Ceará, and by a joint research group at Santos sponsored by the University of São Paulo and the São Paulo State Secretariat of Agriculture. SUDENE has analyzed sample catches of tuna and other fish for age and weight, growth and reproduction cycles, dietary habits, etc. (United States Embassy, Rio de Janeiro, Brazil, January 14, 1966.)

Note: Dr. Melquiades Pinto Paiva of the University of Ceará is reported to have published papers on tuna in the Boletim de Estudos de Pesca which was issued by SUDENE through 1963. Lists of research papers on tuna are contained in FAO Report No. 1917 (Development of the Marine Fisheries Biology Research Program) and in FAO Fishery Report No. 27 (Report of the Second Session of the FAO Working Party for Rational Utilization of Tuna Resources in the Atlantic Ocean.)



Bulgaria

U.S.S.R. TO IMPORT TRAWLERS FROM BULGARIA:

Beginning in 1966 the Shipyards at Burgas, on Bulgaria's Black Sea coast, will specialize in the construction of fishing vessels. During Bulgaria's new 5-Year Plan (1966-1970), 220 fishing trawlers will be produced; of those, 120 will be exported to the Soviet Union which will operate them in the North Sea, the Barents Sea, and the Baltic Sea. This new series of trawlers will each have 300 horsepower motors; a displacement of 311 tons; and a length of about 30 meters (118 feet). Each trawler will be able to operate continuously for 19 days and nights without refueling; each will have a refrigeration hold with a volume of 100 cubic meters (3,531 cu. ft.) maintained at a constant temperature of -4° centigrade (24.8° F.). All processing will be fully mechanized. (Zemedelesko Zname, November 26, 1965, page 1.)

Editor's Note: The design for the new fishing trawlers was prepared by the Scientific Research and Design Institute of Shipbuilding of Varna. That Institute collaborates closely with similar institutes in the Soviet Union. The prototype of the new class was launched in early 1965, and serial production is to begin in early 1966. The U.S.S.R. probably placed the order with Bulgaria because of lower production costs as well as for trade and other considerations. It is believed that these additions to the Soviet fleet will serve mainly to replace obsolete Soviet trawlers built in the early post-World War II era in East Germany. They will not be used to further expand Soviet Baltic and North Sea operations.



Canada

TUNA CANNERY BEING BUILT IN NEW BRUNSWICK:

On November 4, 1965, construction began on an east coast Canadian tuna cannery in New Brunswick, between St. Andrews and St. Stephen. Total cost of the cannery will be about C\$1.5 million.

To supply the plant, 3 tuna vessels (combination trawler-purse seine vessels) will be built at a cost of about C\$6.0 million.

The cannery will have 60,000 square feet of space to handle 20 million pounds of tuna annually, and will be able to process 100,000 cans a day. The cannery is expected to employ 200 people from the surrounding area. The target date for the plant to be in operation is December 1966.

The tuna vessels built to supply the plant will each have a holding capacity for 1,000 tons of frozen tuna. The vessels will be capable of fishing anywhere in the world. For 8 months of the year they will probably operate in the southern Pacific. Through the Panama Canal, some Pacific grounds are actually closer to New Brunswick than to California. For the other 4 months of the year, the fleet is expected to fish the North and South Atlantic. (Trade News, November 1965, and other sources.)

Note: See Commercial Fisheries Review, Aug. 1964 p. 55; June 1964 p. 37; Jan. 1964 p. 44.

* * * * *

GROUND FISH EXPORTS TO AUSTRALIA:

Three Nova Scotia firms have begun shipping groundfish to Australia. One hopes to sell a million pounds of fish to Australia in 1966. Another one exports to Australia all flounder in excess of its needs for the domestic market, and the third firm has been selling groundfish, mostly sole, to Australia since 1964. A representative of one of the firms said cod, flounder, and ocean perch are very well received in Australia. He explained that the Australian preference for those species may result from the large number of European immigrants who are used to eating Atlantic fish.

Canadian sales success in Australia could be at the expense of frozen fish products now shipped to Australia from Europe. The Canadians have comparatively low shipping costs via the Panama Canal and consider themselves competitive with European producers.

A Nova Scotia firm said it was cheaper to ship to Australia than to France because of routing problems to France. Monthly refrigerated vessel service is available between Halifax and Australia. (United States Consulate General, Halifax, January 6, 1966.)

* * * * *

LOBSTER-SPLITTING MACHINE DEVELOPED:

A prototype lobster-splitting machine has been developed by an engineer with the Canadi-

Canada (Contd.):

an National Research Council. In late 1965, the machine was undergoing further tests in the Maritimes. It splits top and bottom of the lobster shell, allowing the meat to be extracted quickly and without waste. The claws are put through the machine separately. The inventor estimates that the machine can split between 300 and 400 lobsters an hour. (Canadian Trade News, November 1965.)

* * * * *

LOBSTERS SHIPPED TO DENMARK:

Canadian lobsters, airfreighted to Denmark, compete successfully with those from Scotland and Norway. The Canadian lobsters sell for \$2.30-2.45 a pound as compared with \$3.25-3.85 for the others.

* * * * *

GOVERNMENT INCREASES EMERGENCY ASSISTANCE TO FISHERMEN FOR CATCH FAILURE:

An emergency assistance plan for fishermen suffering serious catch failure was announced by the Canadian Federal Government, December 3, 1965, and expanded January 15, 1966. As expanded, the emergency plan will supplement unemployment insurance in order to raise total benefits over a 3-months period to a maximum of \$350 for fishermen with dependents and \$200 for single fishermen. To be eligible for the emergency aid, fishermen must have 5 weeks of contributions to unemployment insurance. This is the first occasion on which the Canadian Government has made a direct payment to fishermen to compensate for loss of income due to failure of their catch. (Canadian Department of Fisheries, Ottawa, January 15, 1966.)

* * * * *

INSURANCE FOR FISH TRAPS AND SHORE INSTALLATIONS:

As of February 1, 1966, the Canadian Government began offering insurance in the Atlantic Coast provinces and British Columbia for fixed fishing gear (cod traps, herring traps, herring weirs, etc.) and shore installations (buildings only) against natural perils. The insurance is being offered on a 1-year experimental basis, and will cover assets valued from \$300 to \$15,000 for loss due to storms, ice, fire, etc., but not theft. It will pay 60 percent of appraised value on total

loss, and a lesser indemnity for partial loss. Premium will be 1 percent of value. Coverage is an experimental extension of Canada's Fishermen's Indemnity Plan, which for the past 12 years has provided low-cost insurance for fishing vessels.

The new plan for fixed gear and shore installations will be reviewed after it has been in effect for 12 months, at which time a decision will be made as to whether or not it will be continued and if so, what amendments would be desirable. (Canadian Department of Fisheries, Ottawa, January 11, 1966.)

* * * * *

FEDERAL DEPARTMENT OF FISHERIES SETS UP NEW OFFICE TO ADMINISTER ECONOMIC AID:

The Federal Department of Fisheries of Canada has established a new position--director of special programs--to administer economic and other aid to the fishing industry. The new position was created in the course of a major reorganization in the Federal Department of Fisheries. Programs already in existence which will be administered by the new office include the Fishermen's Indemnity Plans, the Newfoundland Bait Service, and the Salt Assistance Plan. (Canadian Fishermen, January 1966.)

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NEW TRADE COMMISSION OFFICE OPENED IN FAR EAST:

A new office of the Canadian Government Trade Commissioner Service has been opened in Kuala Lumpur to provide a more direct trade link with Malaysia, Burma, and Brunei.

The new office brings the number of Canadian Trade and Commerce posts abroad to 67.

Canadian imports from Malaysia in 1964 included frozen tuna valued at C\$218,000. (Canadian Department of Trade and Commerce, Ottawa, December 15, 1965.)

* * * * *

FIRM BUILDING LARGE FISH-PROCESSING PLANT AT MORTIER BAY, NEWFOUNDLAND:

A Newfoundland plant to process 60 million pounds of fish a year for overseas export will be built at Mortier Bay by a Canadian firm, the Newfoundland Premier announced January

Canada (Contd.):

17, 1966. The operation will involve building a C\$3-million plant, acquiring a dragger fleet, and training employees. Total investment by the firm will be more than C\$13 million. February 1967 is the target date for completion. The Newfoundland Government actively sought the new plant and is pushing the development of groundfish processing for export. (Fisheries Council of Canada Bulletin, January 1966.)

Another fish-processing complex is being set up at St. John's, Newfoundland, by a British firm and a Canadian firm with financial aid from the Canadian Government. Also, in 1965 another large British firm entered into partnership with one of Newfoundland's largest fish-processing firms.



Communist China

LOBSTER FISHING IN EAST CHINA SEA:

A large fleet of Communist Chinese and Japanese drag-net and trawl boats (some of 60 gross tons) were fishing in the East China Sea off the Shantung Peninsula early in 1966 and making rich catches of "taisho lobsters." The Japanese fishermen came from the fishing port of Shimonoseki.

The "taisho lobsters" caught in the East China Sea are most abundant during December-January. They are 20-30 centimeters (about 1 foot) long; as many as 10,000 were harvested per net in only 3 hours of trawling

by at least one Japanese boat. The landings are easily sold in Japan where a good customer demand exists; each lobster brings about 40 yen (US\$0.11) in wholesale markets. A good Japanese catch brought 20 million yen (about US\$56,000) per boat and a captain could make up to \$1,500 a trip.

Japan and Communist China have recently concluded a private fisheries agreement which makes it possible for Japanese fishermen to fish near Communist China's coasts. Large numbers of boats fishing in close proximity nevertheless cause gear conflicts and even collisions. (Asahi, January 4, 1966.)



Cuba

SOVIETS TRAIN CUBAN FISHERMEN:

By September 1964, a total of 483 Cuban fishermen had received training in the U.S.S.R. or on vessels of the Soviet fleet. It was expected that an additional 70-80 students would join that number during 1965-66; and 6 students were scheduled to enter Soviet universities.

Two Soviet fishery research vessels manned by crews of both countries will engage in an extensive research program using Havana as a base. Seven engineers will work temporarily in Cuba as technical advisers in planning the expansion of Cuba's fishing industry, and for two years, 36 Soviet specialists will work aboard six Cuban fishing vessels. (World Fishing, December 1965.)

Note: See Commercial Fisheries Review, Oct. 1965 p. 70; Dec. 1964 p. 90; Nov. 1964 p. 82; June 1963 p. 68.



Denmark

TUNA INDUSTRY TRENDS:

Fishing: Denmark's fishery for tuna is small and based entirely on bluefin tuna (*Thunnus thynnus*) taken mainly in the North Sea, the Skagerrak, the Kattegat, and to a minor extent in the Sound. The North Sea was the principal tuna-fishing ground from 1955 to 1960 and the Kattegat from 1961 to 1964 (table 1). The fishery is conducted for the most part during the months of August, September, and October, with heaviest catches usually made in September. Bluefin tuna are caught on a



Denmark (Contd.):

Table 1 - Danish Tuna Landings, by Area of Catch and Months Fished, 1955-1964					
Year	Quantity	Value	Principal Area	Months Fished	
	Metric Tons	1,000 Kr.			
1964	46	126	SK-KT	Aug. -Sept. -Oct.	
1963	3	14	-	Sept. -Oct.	
1962	152	360	- ↓	Aug. -Sept. -Oct. -Nov.	
1961	144	317	- ↓	Aug. -Sept. -Oct. -Nov.	
1960	47	116	NS-	Aug. -Sept. -Oct.	
1959	772	1,615	NS-	Aug. -Sept. -Oct.	
1958	221	597	NS-	Aug. -Sept. -Oct.	
1957	598	1,247	NS-	Aug. -Sept. -Oct.	
1956	453	1,005	NS- ↓	Aug. -Sept. -Oct.	
1955	1,098	2,253	NS-SK-KT	Aug. -Sept. -Oct.	

Notes: (1) Underlining indicates principal month and principal area.
 (2) "NS" = North Sea; "SK" = Skagerrak; "KT" = Kattegat.
 (3) 1 Danish krone = US\$0.145.
 Source: Fiskeriberetning, 1955-1964.

single hook, baited with herring or mackerel, attached to a line fished from a drifting cutter which has observed the tuna while fishing for herring or mackerel. Chumming with cut up herring or mackerel is practiced. A few tuna are caught incidentally in pound nets. Sportsmen troll for tuna, using herring or mackerel for bait, often selling the catch commercially.

The regular Danish fishing cutter is used in this seasonal fishery; the vessels seine or trawl for other species during the rest of the year. The number of vessels fishing for tuna in any one year fluctuates according to the availability of tuna and was estimated at about 25 vessels in recent years. There is no tuna vessel-building program.

The limited amount of tuna caught is landed at regular shore facilities used for landings of other species. Tuna is canned in 5 or 6 plants which pack primarily herring, brisling, mackerel, etc. There are no programs for building tuna vessels or processing facilities; no new technological developments in the handling of tuna are reported.

Biological research on tuna is conducted on a small scale. The Fishery Research Institute, Charlottenlund, Denmark, has studied the relationship of water temperature to the appearance of tuna in waters near Denmark. In addition, incidental tuna research is done during cruises of the Danish research vessel Dana. No technological research is being done.

Tuna Catch, Consumption and Trade: The Danish catch of tuna has fluctuated considerably during the last decade and has been almost negligible since 1959 (table 1). During

the past few decades, the highest landings were 2,059 metric tons taken in 1952 and the lowest, 3 metric tons in 1963. The major part of the catch is consistently landed in Skagen, a fishing port on the northernmost tip of Jylland Peninsula.

Danish consumption of tuna consists primarily of canned. A small quantity of Danish tuna landings is consumed fresh. Tuna is canned natural style and with tomato sauce. Danish canners use fresh Danish and Norwegian bluefin for the natural pack and frozen imported tuna, preferably dark meat, for the sauce pack. There are about 5 or 6 fish canneries which also pack tuna; a plant in Skagen probably has the largest production.

Table 2 - Denmark's Imports and Exports of Tuna, 1957-1964						
Year	Imports			Exports		
	Fresh	Frozen	Canned	Fresh	Frozen	Canned
	(Metric Tons)					
1964	93.2	1,152.7	174.8	17.3	1.1	20.4
1963	21.0	25.1	121.2	3.4	-	9.0
1962	584.1	4.1	104.3	74.0	-	6.4
1961	222.2	-	94.0	25.6	-	5.1
1960	264.4	22.6	16.3	8.4	1.7	9.5
1959	166.0	0.1	12.7	94.9	346.5	11.0
1958	1/163.1	1/	11.1	1/7.8	1/	6.9
1957	1/271.7	1/	11.5	1/295.5	1/	11.6

1/Fresh and frozen shown together.
 Source: Danmarks Vareindførsel og -Udførsel, 1957-1964.

The trends in Danish tuna trade are shown in table 2. Nearly all the imports of fresh tuna are from Norway. A small amount includes fresh fish landed in Danish ports by Norwegian and Swedish fishermen. The large quantity of frozen tuna imported in 1964 was primarily from Japan. Canning that tuna saturated the Danish market and considerable effort was required to move the pack. Imports of canned tuna have increased in recent years; canned tuna in oil from Peru and specially prepared canned tuna from Yugoslavia account for most of the increased imports. Exports of fresh and frozen tuna have fallen off in recent years due to poor domestic landings. Italy had been the most important foreign market for Danish frozen and fresh tuna. Canned tuna is exported in small quantities to a large number of countries. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, Jan. 26, 1966.)

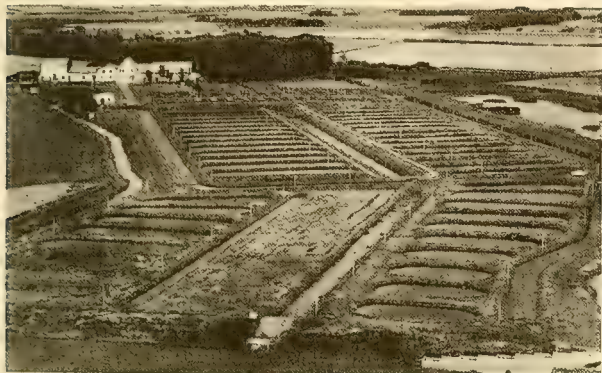
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MINIMUM PRICES SET FOR LIVE AND ICED POND TROUT EXPORTS TO SELECTED EUROPEAN COUNTRIES:

The Danish Ministry of Fisheries in a decree dated January 6, 1966, established min-

Denmark (Contd.):

imum export prices on exports of (1) live pond trout from Denmark to West Germany, Belgium/Luxembourg, the Netherlands, Switzerland, Austria, Sweden, Norway, and France and (2) iced pond trout to West Germany. The action was taken at the request of the Danish pond trout industry under legislation adopted June 4, 1965.



A Danish pond trout enterprise.

For iced trout to West Germany, the minimum export price (f.o.b. Danish border) is about 38.8 U. S. cents a pound for trout with a round weight of 8.82 ounces or over; on a drawn weight basis, the minimum price is 48.0 cents a pound.

For live trout, minimum export prices were set for specified trout sizes for each affected European country. The live trout minimum export prices (including freight and duty in some cases) range from 34.9 cents a pound to 80.7 cents a pound. The wide range is due partly to varying methods of computing freight and duty in the minimum prices for different countries.

The minimum prices reportedly are a compromise. Segments of the Danish industry are only partly satisfied because the decree covers only part of the trout exports--live trout and some ice-packed trout--and only part of the export market. Negotiations continue to extend coverage to other products, especially frozen trout, and other markets. Unless further agreement is reached within the Danish trout industry there is a strong possibility that the decree will be rescinded on April 1, 1966.

The minimum prices were established at a time when the Danish trout oversupply situ-

ation had been relieved. Actually the supply of Danish trout for export in early 1966 was reported to be in short supply. The situation was attributed to weather conditions in Denmark and reaction to overproduction early in 1965 which slowed the production rate during the latter half of 1965. Market prices for live trout in early 1966 were higher than the minimum set in the January 6 decree. The supply situation is also affecting stocks of frozen trout. A cooperative which accounts for about 45 percent of Danish production was not processing any frozen trout in early 1966.

January-November 1965 production of Danish pond trout was 10,143 metric tons, 29 percent higher than the 7,833 tons produced in the same period of 1964.

Danish exports of pond trout in January-November 1965 consisted of 1,961 tons of live trout valued at Kr. 14.4 million (US\$2.1 million), 4,402 tons of fresh iced trout valued at Kr. 25.3 million (\$3.7 million), and 3,560 tons of frozen trout valued at Kr. 25.2 million (\$3.7 million).

Danish producers and exporters are seeking to set up a Joint Centralized Sales Office for frozen trout exports, especially for sales to the United States and Canadian markets. Motivating the effort to establish this new marketing office is the belief of many Danish trout exporters that a special sales office is needed to meet competition from Japanese exporters of frozen trout. (Assistant Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, January 19, 1966.)

Note: A loan copy of the report from the United States Embassy, Copenhagen, giving a detailed breakdown of the new Danish minimum pond trout export prices to certain European countries is available on loan, to firms in the United States only. To borrow Danish Report 554, dated January 19, 1966, write to the Branch of Foreign Fisheries, Bureau of Commercial Fisheries, U. S. Department of the Interior, Washington, D. C. 20240.

* * * * *

ICING REGULATIONS FOR FISH:

Danish regulations require icing of fish while in the auction hall, even at freezing temperatures. They are being enforced despite fishermen's protests because the Danish Fisheries Ministry's Technological Laboratory says ice in the boxes acts as an insulator and prevents the fish from drying out and becoming rancid when thawed. Fishermen ice their catches if out over 6 hours, but this may be extended to 8 hours.

* * * * *

Denmark (Contd.):

BALTIC SEA LUMPSUCKERS RICH SOURCE OF ROE FOR CAVIAR:

Lumpsucker roe is the source of Danish caviar. Lumpsuckers in the Baltic Sea yield much more abundant roe than those in the North Sea, according to a Danish biologist. His studies showed that Baltic Sea lumpsuckers yielded almost 2,000 eggs per ounce of fish as compared with slightly under 1,100 in the North Sea variety.

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FROZEN PRODUCT LABELING REQUIREMENTS:

Beginning December 1, 1965, all Danish frozen products for domestic use, with a few exceptions, were required to carry on the label the net weight of the frozen product. Those containing sauce, soup, brine, water, etc., must also give the drained weight. A tolerance of 5 percent is permitted for net weight and 10 percent for drained weight, but the average weight of a reasonable number of packages must equal the labeled weight.

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DATE MARKING OF FROZEN FISHERY PRODUCTS:

A large Danish fish processor began open (as opposed to coded) marking of the date of production on its frozen fish products on Jan. 1, 1965. Initially, only 20 percent of the frozen products consumed in Denmark are being marked with an open date. However, open-date marking will be offered to buyers in the 17 countries to which the company exports. In previous discussions of open-date marking, most processors have opposed it.

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FISH PROCESSORS SEEK IMPORTED SUPPLIES:

Stable ex-vessel price levels for Danish fish landings can be maintained, according to processors, only if landings are sufficient to keep filleting and other processing lines producing near capacity continuously. The processors are seeking relaxation of import restrictions to augment deficient Danish landings of plaice, cod, and herring. The Danish Fisheries Ministry supports liberalization as in line with Denmark's international trade responsibilities. Fishermen, however, fear adverse effects on prices. As an alternative,

the fishermen have increased herring landing quotas and urged larger landings by Swedish cutters under an existing special agreement.

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FISHERY EXPORTS AND CATCH, 1965:

Preliminary estimates show that the Danish fishing industry can look back on a prosperous 1965 marked by exports valued at a record US\$100 million and a catch only about 5 percent under the record 855,529 metric tons (almost 1.9 billion pounds) landed in 1964.)

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GOVERNMENT FISHERY LOANS, FISCAL 1965:

Fishery loans made by the Royal Danish Fisheries Bank in fiscal year 1965 (April 1964-March 1965) totaled Kr. 20.2 million (US\$2.9 million) as compared with Kr. 16.7 million (\$2.4 million) the previous fiscal year.

A breakdown shows that in fiscal 1965 there were 64 new vessel loans with a total value of Kr. 11.6 million (\$1.7 million), 14 used vessel loans totaling Kr. 1.4 million (\$200,000), 24 fishery industry loans totaling Kr. 6.7 million (\$970,000), and 17 miscellaneous loans with a total value of Kr. 442,000 (\$64,000).

In fiscal 1964, there were 74 new vessel loans with a total value of Kr. 11.9 million (\$1.7 million), 8 used vessel loans with a total value of Kr. 515,000 (\$75,000), 22 industrial loans totaling Kr. 3.7 million (\$530,000), and 116 miscellaneous loans (including 95 loans for ice damage) with a total value of Kr. 615,000 (\$89,000).

Losses on loans during fiscal 1965 amounted to Kr. 43,082 (\$6,247). Funds on loan increased to Kr. 106.8 million (\$15.5 million) in fiscal 1965. The Bank operated under amended Fishery Bank Law No. 170, April 27, 1963, which extended operations to include Greenland in addition to Denmark and the Faroe Islands.

During fiscal 1965, loans were financed by 3 series of bonds issued by the Bank which pay 6 and 7 percent interest. When a loan is approved, the applicant receives bonds for the amount of the loan and must sell them to receive his funds. The market value of the bonds is less than their face value. The bonds were

Denmark (Contd.):

quoted at a discount of about 15 percent in early December 1965.

In late 1965, a representative of the Danish Fisheries Association (mostly vessel owners) complained about the expenses incurred by fishermen building vessels, especially the 15-percent loss in selling the loan bonds. For a modern steel cutter costing Kr. 1.2 million (\$174,000), the owner must supply 20 percent of the cost--Kr. 240,000 (\$34,800)--plus Kr. 50,000 (\$7,250) for gear, and Kr. 180,000 (\$26,100) to make up the loss on the sale of bonds for a total of about Kr. 470,000 (\$68,150).

Fishing vessel owners are aided by favorable vessel depreciation regulations. For example, tax-free depreciation may be claimed annually on fishing vessels up to 30 percent of the book value. Advance tax-free depreciation is allowed on vessels when the construction price aggregates at least Kr. 200,000 (\$29,000). Depreciation may be claimed for the first time in the year when a contract to build a vessel is concluded, and each year thereafter preceding the year delivery takes place. The total amount of advance tax-free depreciation may not exceed 30 percent of the contract price. The annual rate of advance depreciation is optional to the vessel owner, but may not exceed 15 percent in any one fiscal year. (Regional Fisheries Attache, United States Embassy, Copenhagen, December 15, 1965.)

FISHING VESSEL LOAN FUNDS NEARLY EXHAUSTED:

The Government-guaranteed fund of nearly US\$22 million for the Danish Fisheries Bank was almost exhausted in late 1965 just as demands were increasing because of tightening credit in Denmark. Industry representatives were seeking a further guarantee of \$14 million to meet the demand for cutter construction funds stimulated by 1965's near-record landings and relatively high prices. About 100 new cutters are reported ordered for delivery in 1966 and 1967.

EX-VESSEL FISH PRICES, NOVEMBER 1965:

Landings of most Danish fish brought higher prices in 1965 than in 1964. Average No-

vember 1965 prices (November 1964 in parentheses) in U. S. cents per pound ex-vessel were: cod 8.6 (8.3); plaice 20.2 (15.1); industrial fish 2.1 (1.45); herring 5.6 (4.2); haddock 9.4 (7.7), and dogfish 7.8 (6.5). A few prices declined: salmon \$1.10 (\$1.19); ordinary lobster 89 (\$1.17); and shrimp 29.6 (38.8).



East Germany

FISHERY TRENDS, LATE 1965:

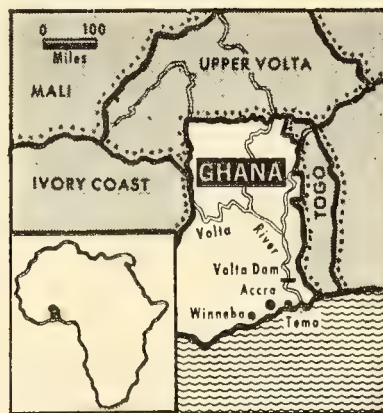
An East German trade delegation visiting Danish fishing ports the latter part of 1965 said East Germany's fishing fleet was increasing steadily and the country was about to become self-sufficient with regard to fish. However, because Denmark delivered such a quality fresh product, East Germany still had a buying interest in Danish fish.



Ghana

NORWAY DELIVERS LAST OF SEVEN STERN TRAWLERS:

The last of seven stern trawlers built by a Norwegian shipyard for the Ghana State Fishing Corporation was delivered in Trondheim early this year. Named the Agyimfra, the vessel is a sistership of the other six motor



trawlers. The vessel is 231 feet long, has freezing facilities for 24 metric tons of fish a day, and has a hold capacity for 35,000 cubic feet of fish. (The Export Council of Norway, January 1966.)



Greece

FISHERY TRENDS, JANUARY-AUGUST 1965:

Atlantic Freezer-Trawler Fishery: Landings by the Atlantic fleet of Greek freezer trawlers in January-August 1965 totaled 16,029 metric tons as compared with 13,135 tons in the same period of 1964. Greek freezer trawlers reported slightly improved fishing conditions off West Africa in August 1965. The catch included smaller amounts of horse mackerel but larger quantities of sea bream. The shrimp catch was insignificant. Weather hampered fishing in the northern section of the African grounds.

Shrimp Fishing Venture in the Persian Gulf: A new Greek shrimp-fishing venture got under way in late August 1965 when four Greek trawlers sailed for the Persian Gulf. Plans called for the trawlers to deliver their Persian Gulf shrimp catch to the Greek freezer-trawler Evangelistria for freezing and transport. The venture is sponsored by a Greek fishing company operating under a permit of the Iranian Government.

Kuwait Shrimp Fishing Attracts Greek Technicians: An experienced Greek trawler skipper reportedly has been appointed technical manager of a newly established Kuwait shrimp-fishing company. The new company is said to be building wooden fishing vessels of up to 100 tons in Kuwait. The vessels are to be fully equipped with fish-finders and other electronic equipment. The first vessel was reported ready for launching in August 1965. The Kuwait company was seeking Greek skippers, engineers, and fishermen to man its new vessels. (Alieia, September 1965.)

Note: See Commercial Fisheries Review, January 1966 p. 74.



Greenland

SALMON CATCH DECLINES IN 1965:

The Greenland inshore salmon catch will total only about 700 metric tons (1,540,000 pounds) in 1965 as compared to 1,400 tons (3,080,000 pounds) in 1964. The decline was due to lower prices to the fishermen, a change in availability as indicated by larger catches farther north, and better cod fishing. Market prices are recovering from the unexpectedly large catch in 1964.

Fishing offshore from Greenland in the fall of 1965, a Norwegian vessel caught about 12 tons of salmon and the Faroese gill-net vessel Bakur caught about 40 tons. The salmon on the Bakur averaged about 10-13 pounds each and were of good quality when landed in Denmark. The Bakur's salmon catch was taken during about $3\frac{1}{2}$ months of fishing, mostly 3 to 12 miles off Greenland. A Danish processor paid about US\$1.28 a pound for the Bakur's salmon.

The financial success of the Bakur's trip, together with the knowledge of offshore salmon fishing that has been gained, makes it reasonably certain that at least a few vessels will fish for salmon again off Greenland in the fall of 1966. The Bakur might be replaced by a smaller vessel which could fish gill nets more effectively. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, January 10, 1966.)

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SHRIMP FISHERY TRENDS IN 1964 AND FUTURE OUTLOOK:

In 1964, the Greenland catch of heads-on shrimp amounted to 3,770 metric tons, up 13 percent from the 3,341 tons landed in 1963. The Royal Greenland Trade Department (RGTD) processed about 95 percent of the 1964 catch and the remainder was handled by private companies. Output in 1964 included 379 tons of canned or jarred shrimp (166 tons hand-peeled and 213 tons machine peeled) and 407 tons of frozen shrimp. In 1964, exports of frozen shrimp from Greenland by the RGTD totaled more than 290 tons, with 186 tons to Denmark and the remainder to other European countries. Exports of canned and jarred shrimp from Greenland in 1964 went to 66 countries; Denmark was the leading buyer, followed by the United States, West Germany, the United Kingdom, Finland, and Switzerland.

The Greenland shrimp fishery has shown a steady rise in past years and should continue to grow. According to biologists, the resource can support a much larger fishing effort. Efforts in marketing, processing, and fishing will probably be the measure of future growth in the Greenland shrimp industry.

In recent years, good shrimp prices and the generous subsidy and loan program of the Danish Government have enabled many Green-

Greenland (Contd.):

land fishermen to own their own shrimp vessels. Those craft have generally tended to be between 10 and 20 gross tons. Vessels in that category are eligible for a subsidy covering 20 percent of the total cost and a loan covering 70 percent of the cost (repayable in 15 years at 4 percent annual interest). Thus a shrimp fishermen may have to provide only 10 percent of the initial cost to acquire a vessel. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, December 28, 1965.)



Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, NOVEMBER 30, 1965:

As of November 30, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 1,010 metric tons, a decline of 1,614 tons from the stocks on hand October 31, 1965. (United States Embassy, Reykjavik, December 27, 1965.)

Icelandic Export Stocks 1/ of Principal Fishery Products, November 30, 1965

Item	Qty. Metric Tons	Value	
		Million Kr.	US\$ 1,000
Groundfish, frozen: for export to:			
U. S.	1,010	26.9	624.7
other countries .	4,388	83.4	1,936.8
Stockfish	1,230	38.1	884.8
Herring, frozen . .	4,645	26.5	615.4
Industrial products:			
fish meal:			
herring	44,126	370.7	8,608.9
other fish	1,868	13.9	322.8
herring oil	48,653	384.4	8,927.1

1/Includes only stocks intended for export.
Notes: Icelandic kronur 43.06 equal US\$1.00.

United States imports of frozen groundfish fillets from Iceland in the year 1964 totaled 17,812 metric tons of groundfish blocks and slabs, 4,669 metric tons of cod fillets, 2,791 metric tons of haddock fillets, and 548 metric tons of ocean perch fillets.

EXPORTS OF FISHERY PRODUCTS, JANUARY-OCTOBER 1965:

During January-October 1965, there was an increase in exports of salted fish, herring

Icelandic Fishery Exports, January-October 1965 with Comparisons

Product	Jan.-Oct. 1965			Jan.-Oct. 1964		
	Qty.	Value f.o.b.		Qty.	Value f.o.b.	
	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000
Salted fish, dried	2,314	46,221	1,072	890	22,532	523
Salted fish, uncured	23,558	394,156	9,144	22,821	353,123	8,192
Salted fish fillets	1,512	25,624	594	1,047	15,280	354
Wings, salted	1,470	19,877	461	1,173	14,765	343
Stockfish	9,688	293,995	6,821	9,225	260,876	6,052
Herring on ice	1,866	1,206	28	19	140	3
Other fish on ice	44,436	152,142	3,530	27,415	162,846	3,778
Herring, frozen	18,752	119,422	2,771	16,250	96,939	2,249
Other frozen fish, whole . .	5,403	63,914	1,483	3,257	35,404	821
Frozen fish fillets	43,767	1,011,132	23,458	48,085	960,351	22,280
Shrimp and lobster, frozen .	816	103,688	2,406	1,028	94,594	2,195
Roes, frozen	1,934	30,166	700	1,624	26,652	618
Canned fish	537	23,446	544	310	15,411	358
Cod-liver oil	5,398	57,066	1,324	9,132	84,593	1,963
Lumpfish roes, salted . . .	851	44,918	1,042	419	10,609	246
Other roes for food, salted .	2,033	33,530	778	2,644	39,515	917
Roes for bait, salted . . .	826	8,749	203	3,049	25,280	586
Herring, salted	19,920	239,142	5,548	31,689	348,528	8,086
Herring oil	59,086	496,357	11,515	36,330	284,868	6,609
Ocean perch oil	-	-	-	28	188	4
Whale oil	3,066	28,184	654	3,782	32,322	750
Fish meal	18,123	121,991	2,830	25,354	157,552	3,655
Herring meal	83,473	606,691	14,075	75,403	453,151	10,513
Ocean perch meal	2,689	19,763	459	1,894	11,084	257
Wastes of fish, frozen . . .	8,954	32,634	762	6,196	19,690	457
Liver meal	569	4,042	94	502	3,323	77
Lobster and shrimp meal . .	50	231	5	156	686	16
Whale meal	1,254	7,964	185	1,211	6,694	155
Whale meat, frozen	2,571	23,000	534	1,928	15,322	355

Note: Values converted at rate of 1 krona equals 2.32 U.S. cents.

and other fish on ice, frozen herring, canned fish, herring oil, herring meal, and ocean perch meal, as compared with the same period in 1964, according to the Icelandic periodical *Hagtidindi*, November 1965. Exports of frozen fish fillets, cod-liver oil, salted herring, whale oil, and fish meal showed a considerable decrease in the first 10 months of 1965.

FISHERY CATCH AND TRENDS, 1965:

In 1965, Iceland's fish catch was a record 1,166,000 metric tons, according to preliminary data from the Fisheries Association of Iceland. That was a gain of almost 20 percent from the previous record catch of 971,574 tons in 1964.

Most of the Icelandic catch goes for export products. The f.o.b. export value of the 1965 catch has been conservatively estimated at Kr. 5,300 million (US\$123 million), a 15-percent increase over 1964.

The 1965 catch was marked by a sharp rise in the herring catch, but a drop in the higher-valued groundfish catch. The 1965 herring catch totaled 753,000 tons (a 38-percent increase over 1964). However, the groundfish catch in 1965 declined 13 percent to about 361,000 tons from 415,305 tons in 1964.

Iceland (Contd.):

The 1965 catch also included 50,000 tons of capelin (8,000 tons in 1964) and 4,000 tons of shellfish (3,173 tons in 1964).

The big increase in the herring catch was attributed to modern vessels and fish-finding equipment (without which the season would have been poor), and to the buildup in the herring fleet at the expense of groundfish operations. The scattered shoals of cod found in 1965 made fishing for groundfish less attractive.

The reduced catch of groundfish will force some restriction in Iceland's expanding markets for frozen fish blocks and fillets, while the tremendous herring catch will increase Icelandic reliance on the more volatile world markets for fish meal and oil. (United States Embassy, Reykjavik, January 6, 1966.)

FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-AUGUST 1965:

Species	January-August	
	1965	1964
	(Metric Tons)	
Cod	211,645	262,181
Haddock	36,783	36,971
Saithe	19,268	17,917
Ling	3,488	3,635
Wolfish (catfish)	7,011	7,894
Cusk	1,296	2,794
Ocean perch	20,987	20,904
Halibut	597	800
Herring	347,317	350,375
Capelin	49,611	8,640
Shrimp	408	202
Other	10,194	9,504
Total	708,605	721,817

Note: Except for herring which are landed round, all fish are drawn weight.

UTILIZATION OF FISHERY LANDINGS, JANUARY-AUGUST 1965:

How Utilized	January-August	
	1965	1964
	(Metric Tons)	
Herring and capelin ^{1/} for:		
Oil and meal	360,818	311,404
Freezing	14,317	13,535
Salting	21,639	33,983
Groundfish ^{2/} for:		
Fresh on ice	24,090	23,748
Freezing and filleting	144,351	158,372
Salting	79,092	84,635
Stockfish (dried unsalted)	49,396	80,667
Canning	186	117
Oil and meal	2,096	2,923
Crustaceans for:		
Freezing	2,729	2,631
Canning	123	36
Home consumption	9,768	9,766
Total production	708,605	721,817

1/Whole fish.
2/Drawn fish.



Japan

CANNED TUNA MARKET SURVEY IN WEST GERMANY:

The Japan External Trade Promotion Organization (JETRO) has released a report on the canned tuna market survey conducted by that organization in West Germany in 1965. According to the report, West Germany is the second largest market after the United States for Japanese canned tuna exports. Unlike the United States, which primarily imports canned tuna in brine, West Germany imports predominantly lightmeat tuna packed in oil. Other suppliers of canned tuna to West Germany include such countries as Yugoslavia, Peru, Malaysia, and Spain. It was not known to what extent their products competed with Japanese exports and so the survey was conducted to study the canned tuna demand and supply relationship in West Germany and to obtain other basic information in an attempt to ascertain the attitude of German distributors and consumers toward Japanese canned tuna and other competing products.

The JETRO survey revealed the following facts:

1. Imports of canned tuna by West Germany have been trending upwards in recent years, with 21 countries now supplying canned tuna to that country. Imports from Japan, which account for over one half of the trade, are increasing, whereas imports from Yugoslavia and Peru are declining.

2. Canned tuna packed in West Germany and Spain is superior to that packed in other countries, but the German production and Spanish exports to West Germany are very small. Consequently, they have not affected Japanese exports to that country. Japanese canned tuna is highly regarded by German buyers and consumers for its quality. A prominent German fish importer who was asked why he thought Japanese canned tuna led all other similar imports by his country remarked that Japanese products consistently maintained a high quality.

3. The City of Berlin reportedly maintains a reserve supply of 20 million cans of tuna for emergency use, which are stored for a period of 10 years and then replaced with a fresh stock. In West Germany, the people seem to particularly favor lightmeat tuna packed in oil. Many German housewives consider bluefin to make the best tuna pack, followed in

Japan (Contd.):

order by yellowfin, skipjack, albacore, and big-eyed.

4. The emergence of Japanese canned tuna on the West German market may appropriately be called an "overwhelming development." Like canned tangerine, Japanese canned tuna products have created a wonderful image in the minds of German consumers. However, despite this favorable condition, sales are not expected to show any appreciable gain. This is because the West German market today abounds in all sorts of attractively packaged, eye-catching foods which are being extensively promoted and which are creating a deep impression on the consumers.

5. Under the present Japanese production setup, where tuna processors pack their products under numerous brands, it is probably impossible to reduce the number of brands to 2 or 3. However, it is believed that greater stress could be laid on promoting the identity of Japanese products and thereby enhancing their image. A great potential exists for expanding the West German canned tuna market, and it is no exaggeration to say that it is fully possible to increase the present volume of canned tuna sales by about 40 percent within the next 1 to 1½ years. (Suisan Keizai Shimbun, December 9, 1965.)

TUNA CANNED IN BRINE EXPORT SALES TO U. S. RESUMED:

Sales of Japanese canned tuna in brine for export to the United States had been suspended since December 1, 1965, due to deadlocked negotiations between tuna packers and exporters over conclusions of a new exporters agreement (exporters agreement for business year 1965 expired November 30, 1965). Sales were temporarily resumed when the Government on December 24, 1965, announced that it would apply the interim export validation standard based on the Trade Control Ordinance to permit exports until January 31,

1966. During the two months, the Government was to validate canned tuna in brine exports totaling 500,000 cases, to be allocated to exporters on the basis of a 70-percent past performance quota and a 30-percent adjustment quota. For the December sales, the Japan Canned Tuna Sales Company planned to offer 180,000 cases (150,000 cases of white-meat tuna and 30,000 cases of lightmeat tuna).

Price negotiations, which had been in progress between the Sales Company and exporters, were settled on December 24, 1965, resulting in raising the export prices an average of 70 cents a case for canned whitemeat tuna and 20 cents a case for canned lightmeat tuna. The new f.o.b. Japan prices went into effect in December; they are base prices and exclude promotional allowances heretofore granted to exporters and premiums previously paid to packers to encourage production. (Suisan Tsushin, December 27, 1965.)

ALBACORE TUNA EX-VESSEL PRICE TRENDS, DECEMBER 1965:

Small quantities of albacore tuna were being landed in December 1965 at such ports as Kesennuma and Shiogama in northeastern Japan by long-line vessels engaged in the winter albacore fishery. The ex-vessel price of albacore landed at those ports was:

Port	Date	Ex-Vessel Price	
		Yen/Kg.	US\$/Short Ton
Kesennuma	Dec. 13	180-217	454-547
Shiogama	Dec. 14	220-260	554-655
Kesennuma	Dec. 15	130-200	328-504
Shiogama	Dec. 15	188-233	474-587

The high price paid for albacore at that time of the year was due to increased domestic demand in Japan for all varieties of fish for the holiday fresh fish trade. (Suisan Keizai Shimbun, December 14-16, 1965.)

ALBACORE TUNA EXPORT QUOTA TO U. S. INCREASED:

The Japan Export Frozen Tuna Producers Association, at a meeting December 16, 1965,

Tuna Pack	Can & Case Size	New Base Price	Old Price
(US\$/Case)			
Whitemeat	7-oz. 48's	9.70	9.50 (incl. 60¢ advertising allowance)
"	13-oz. 24's	8.95	8.80 " " "
"	4-lb. 6's	10.40	10.10 " 30¢ promotional allowance)
Lightmeat	7-oz. 48's	8.15	7.35 " 60¢ premium to packers)
"	13-oz. 24's	7.90	7.15 " 60¢ " " "
"	4-lb. 6's	8.75	8.45

Japan (Contd.):

decided to use 5,000 short tons of the 15,000-ton adjustment quota for exporting frozen round albacore directly to the United States from Japan proper. The albacore export quota (for direct shipment to the United States) had been set at 30,000 short tons for fiscal year 1965 (April 1965-March 1966) but that quantity was expected to be arrived at by early 1966. (Suisan Tsushin, December 13 & 17, 1965.)

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FROZEN TUNA EXPORT PRICES
TO ITALY, DECEMBER 1965:

The price of Japanese frozen dressed yellowfin tuna exported to Italy continued to trend upwards and record new highs. Towards mid-December 1965 it was US\$490-495 a metric ton c.i.f., compared to the November 1965 price of \$455-460. In 1964, the average Japanese export price for yellowfin to Italy was \$409 a ton; in 1963, \$394.

In December 1965, other c.i.f. prices of Japanese dressed frozen tuna transshipped to Italy were: bluefin \$455-460 a metric ton (1964 high \$390, 1964 average price \$339); big-eyed \$390 (1964 high \$360, 1964 average price \$276).

The rapid increase in the price of Japanese tuna exported to Italy is attributed to: (1) expansion of processing facilities and increase in consumer demand for canned tuna in Italy; (2) shortage of supply of tuna as a result of the rapid decline in Japanese fishing effort in the Atlantic, which earlier in 1965 consisted of about 160 vessels but in December 1965 only 100 long-liners; and (3) the large drop in the catch of yellowfin tuna. (Suisan Tsushin, December 14; Katsuo-Maguro Tsushin, November 26, 1965.)

* * * * *

COMPANY INCREASES ATLANTIC OCEAN
TUNA PURSE-SEINING EFFORT:

A fishing company announced at a press conference on December 17, 1965, plans to dispatch in 1966 two additional pairs of two-boat seiners to West Africa to join that firm's mothership-type purse-seine fleet (led by the 1,600-ton mothership Chichibu Maru No. 2). Despite large losses suffered from the 1965 operations, the fleet was successful in catching a total of 4,000 metric tons of fish (con-

sisting of 50 percent yellowfin, 40 percent skipjack, and 10 percent miscellaneous species), and the fishery was considered to hold promise. (Suisan Tsushin, December 18, 1965.)

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TUNA PURSE SEINER REPORTS
GOOD FISHING IN SOUTH PACIFIC:

The Japanese purse seiner Taikei Maru No. 23 (212 gross tons), which left Japan, December 3, 1965, on a tuna fishing trip to the southwest Pacific Ocean, began fishing off New Guinea around December 13. She unexpectedly encountered good fishing, taking a full load in one week. She was scheduled to be back in Japan around December 27 or 28 with 65 metric tons of skipjack and 250 tons of yellowfin tuna. (Katsuo Maguro Tsushin, December 22, 1965.)

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FIVE TRAWLERS TO CONDUCT WINTER
OPERATIONS IN GULF OF ALASKA:

Japan expected to have a total of five large stern trawlers operating in the Gulf of Alaska during winter 1965/66. They include the Taiyo Maru No. 82 (2,886 gross tons), Daishin Maru No. 12 (2,967 gross tons), Takachiho Maru (3,494 gross tons), Koyo Maru (2,521 gross tons), and Akebono Maru No. 53 (1,450 gross tons). The Taiyo Maru No. 82 in early December 1965 was already on the fishing grounds (since September), as was the Daishin Maru No. 12 which departed Japan, November 26. Scheduled departure dates for the other three vessels were: Takachiho Maru, December 10, Koyo Maru, December 14, and the Akebono Maru, late January or early February 1966. The 276-ton fishing vessel Fukuho Maru reportedly will fish for the Koyo Maru but as of early December her port departure had not been fixed.



Akebono Maru, large Japanese stern trawler fishing in the Gulf of Alaska during the winter of 1965/66.

It is also reported that another fishing company will dispatch a 2,400-ton stern trawl-

Japan (Contd.):

er to the Gulf in April 1966. On December 10, the Fisheries Agency announced the issuance of a construction permit to that firm. The trawler is to be constructed at a shipyard in southern Japan. (Suisancho Nippo, December 14; Suisan Keizai Shimbun, December 7, 1965.)

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FISHING PLANS FOR 1966 IN BERING SEA-GULF OF ALASKA:

Applications submitted to the Fisheries Agency by firms planning mothership-type trawl fisheries in the Bering Sea and Gulf of Alaska show that Japan plans to operate in 1966 a total of 14 motherships accompanied by 208 catcher vessels in the Bering Sea and 11 motherships accompanied by 11 catcher vessels in the Gulf of Alaska. The previous year 13 motherships and 175 catchers operated in the Bering Sea and in the Gulf about

Table 1 - List of Mothership-Type Bottomfish Fleets Planning to Operate in the Bering Sea in 1966^{1/}

Mothership	Size	Catcher Vessels
	Gross Tons	No.
<u>Soyo Maru</u>	11,192	25
<u>Tenyo Maru</u>	11,581	15
<u>Einin Maru</u>	7,482	16
<u>Gyokuei Maru</u>	10,357	30
<u>Shikishima Maru</u>	10,144	23
<u>Aso Maru</u>	3,499	1
<u>Chichibu Maru</u>	7,472	12
<u>Meisei Maru No. 2</u>	9,300	11
<u>Kashima Maru</u>	7,163	18
<u>Tenyo Maru No. 3</u>	3,698	1
<u>Seifu Maru</u>	8,269	23
<u>Hoyo Maru</u>	14,111	29
<u>Kotoshiro Maru No. 28</u>	572	2
<u>Shinano Maru</u>	535	2

^{1/}Subject to Fisheries Agency approval.

Table 2 - List of Japanese Bottom-Trawl Fleets Planning to Operate in the Gulf of Alaska in 1966^{1/}

Mothership	Size	Catcher Vessels
	Gross Tons	No.
<u>Taiyo Maru No. 82</u>	2,886	1
<u>Takachiho Maru</u>	3,494	1
<u>Akebono Maru No. 53</u>	1,450	1
<u>Daishin Maru No. 12</u>	2,967	1
<u>Kirishima Maru</u>	3,495	1
Undesignated	2,500	1
<u>Koyo Maru</u>	2,521	1
Under construction	3,500	1
<u>Ryuhō Maru</u>	1,950	1
Undesignated	2,400	1
"	1,500	1

^{1/}Subject to Fisheries Agency approval.



Fig. 1 - Typical small otter trawler fishing in the Bering Sea for a mothership.



Fig. 2 - Shows Bering Sea catch of a Japanese trawler.

8 large trawlers accompanied by small trawlers. (Suisan Keizai Shimbun, January 13, 1966.)

Note: Press reports January 18 indicated that the Central Fisheries Coordination Council (highest Government-industry consultative body) on January 17 approved the operation in the Bering Sea and Gulf of Alaska bottomfish fisheries of 25 mothership fleets, including 216 catcher vessels. The licenses are good until August 31, 1967.

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Japan (Contd.):

**ALASKA POLLOCK FOR FISH MEAL
TO BE BOUGHT FROM SOVIETS:**

The Japanese fishery delegation sent to Moscow by a fishing firm and two trading firms to negotiate the purchase of Alaska pollock (for processing into meal) from the Soviet Union has concluded a contract. It calls for the purchase in 1966 of 45,000 metric tons at US\$20.50 a ton, \$3 above the price paid for Soviet-caught Alaska pollock in 1965.



Hoyo Maru, Japanese fish meal factoryship that is to receive Alaska pollock from trawlers for use in fish meal.

The fishing firm's 14,000-ton fish-meal factoryship Hoyo Maru was scheduled to depart Japan on January 10 for the Okhotsk Sea and to begin receiving deliveries of Alaska pollock from Soviet trawlers January 15. (Suisan Tsushin, January 6 & 10, 1966.)

Editor's Note: According to one report, the purchase was negotiated at a price of \$20.30 a ton. Some periodicals in 1965 reported the 1965 price to be \$16 a ton, but several more recent articles state the price was \$17.50 a ton.

The Hoyo Maru in January-March 1965 received deliveries of about 36,000 tons of pollock from Soviet trawlers. The operation was a success, due in great part to the good demand for meal and the firm price of that product. Subsequently, several other large fishing companies submitted applications to the Fisheries Agency to purchase pollock from the Soviet Union for processing into meal and minced fish meat. This was vigorously opposed by the Hokkaido fishermen and processors. The Agency eventually authorized only the one firm to engage in the fishery and granted that firm an increase in quota to 45,000 tons. However, the firm was authorized to produce fish meal only.

Note: See Commercial Fisheries Review, January 1966 p. 84; December 1965 p. 70.

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**GOVERNMENT ANNOUNCES
FISH MEAL IMPORT ALLOCATION:**

The Japanese Ministry of International Trade and Industry (MITI) announced an import allocation of 56,000 metric tons of fish meal for the second six months of fiscal year 1965 (April 1965-March 1966). That is 16,000 tons less than the anticipated import allocation of 72,000 tons, but the reduction in quantity is attributed to a world shortage in fish meal. For FY 1965 fish meal imports authorized by MITI totaled 124,000 metric tons.

Fish meal was quoted on the Japanese domestic market in late November 1965 at an average of \$200 a metric ton, but MITI has calculated the importation of the 56,000 metric tons of meal on the basis of \$180 per ton c.i.f. (Nihon Suisan Shimbun, November 29, 1965.)

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**MACKEREL FISHING COMPETITION FROM
PURSE-SEINERS CAUSES PROBLEMS
FOR POLE-AND-LINE FISHERMEN:**

Conflict has developed in the Japanese coastal mackerel fishery between purse-seine and pole-and-line fishermen. Purse-seine vessels of the Japanese Surrounding Net Fishery Adjustment Association of the North Pacific Area have moved into the coastal mackerel fishing grounds in large numbers. The entry of the purse-seine vessels is blamed for a drop in the catch of mackerel by pole-and-line fishermen under the East Japan Mackerel Pole-and-Line Fishery Adjustment Association.

Mackerel landings in Japan by pole-and-line fishermen for 1965 as of December 8, 1965, were 30,401 metric tons valued at US\$3.78 million. Compared with 1964, that was a drop of 29 percent in quantity and 21 percent in value. On the other hand, mackerel landings by Japanese purse-seine fishermen in the first 11 months of 1965 were 167,300 tons, valued at \$12.87 million, an increase of 112 percent in quantity and 130 percent in value over 1964.

Pole-and-line fishermen of Kanagawa, Shizuoka, and Ehime Prefectures have been hit especially hard by the competition from purse-seine vessels. It has caused a drop in ex-vessel prices as well as a catch decline for the pole-and-line vessels.

Japan (Contd.):

In late 1965, the pole-and-line fishermen presented a petition to the Japanese Fisheries Agency asking that (1) purse-seine fishing be prohibited at night; (2) the purse-seine fishing season be shortened; and (3) the purse-seine fishing grounds be restricted. The purse-seine fishermen oppose such limitations.

The Japanese Fisheries Agency scheduled a meeting between the two groups on December 16, 1965. The Fisheries Agency was expected to mediate the dispute. (Nihon Keizai, December 15, 1965.)

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MACKEREL FISHERY OFF TO GOOD START:

The Japanese pole-and-line mackerel fishery, which started January 8 off the Pacific coast of Chiba Prefecture (east of Tokyo), got off to a good start. Catches between 1,300-1,700 metric tons were being landed daily and sold at ex-vessel prices of 40-50 yen a kilogram (US\$101-126 a short ton). Mackerel packers were hoping to begin packing around January 20, but were waiting for prices to drop below the 40-yen-per-kilogram level. (Kanzume Nippo, January 18, 1966.)

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SAURY CATCH DOWN IN 1965:

The total catch of saury as of December 15, 1965, was estimated at 227,000 metric tons and had already exceeded the 1964 catch of about 200,000 tons. By year's end the catch was expected to total about 240,000 tons, but that quantity is far below the catch of 384,000 tons in 1963 and 483,000 tons in 1962. The landed value of the 1965 catch through December 15 was estimated at 9,200 million yen (US\$25.5 million), exceeding by 53 percent 1964's estimated value of 6,000 million yen (US\$16.7 million). The large increase in value is attributed to the poor fishing conditions which prevailed during the early part of the season and fear of another poor season, thereby resulting in competition for supplies among such groups as bait and canned food processors. (Suisan Tsushin, December 16, 1965.)

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WHALING OPERATION IN NEWFOUNDLAND UNDER STUDY:

A Japanese fishing company is studying a plan to establish a whaling operation in Newfoundland. The Japanese firm, through a trading firm, in December 1965 was conducting negotiations with Canadian interests. In September 1965, that firm chartered a vessel to conduct studies on the whale resources off Newfoundland, but completely reliable results were not obtained because of the shortness of the charter period. (Nihon Suisan Shimbun, December 1, 1965.)

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HERRING ROE SHORTAGE PUSHES PRICES TO RECORD HIGH:

There was reported to be a great shortage in Japan in early December 1965 of processed herring roe, which is in great demand during the New Year holiday season. As a result, on December 7, top-quality dried herring roe had been bid up to 22,500 yen per kilogram (US\$28.40 a pound) by buyers at the Tokyo Central Market. Top price paid for herring roe in 1964 was 17,000 yen per kilogram (\$21.46 a pound), with the average ranging between 12,000-13,000 yen kilogram (\$15.15-\$16.41 a lb.) Top price paid in 1963 was 16,500 yen a kilogram (\$20.80 a lb.). (Suisan Keizai Shimbun, December 9, 1965, and other sources.)

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REST HOME FOR FISHERMEN TO BE ESTABLISHED AT LAS PALMAS:

The Japanese Welfare and Health Ministry and the Finance Ministry here agreed to establish at Las Palmas, Canary Islands, a rest home for crew members of Japanese vessels engaged in pelagic fisheries in the Atlantic. The home will be the first such official facility overseas and work on it was scheduled to begin the spring of 1966. A suitable Spanish villa will be remodeled at a cost of 20 million yen (US\$56,000). Work is expected to be completed by early 1967.

Las Palmas is a large base for Japanese fisheries in the Atlantic. Almost all major Japanese fishing companies have bases at Las Palmas. On some days more than 1,000 Japanese fishermen go ashore there. It is estimated that over 8,000 Japanese fishermen are engaged in fishing operations from Las Palmas. Many of the fishermen are away

Japan (Contd.):

from home for more than a year. The home will provide a place for recreation and relaxation. (Nihon Keizai, January 13, 1966.)

JAPAN-COMMUNIST CHINA PRIVATE FISHERIES AGREEMENT RENEWED:

Japanese private fishery interests and Communist China, on December 17, 1965, reached accord in Peking to extend for another 2 years the Japan-Communist China Private Fishery Agreement covering fishing operations in the East China Sea and the Yellow Sea, effective December 23, 1965. Agreement was reached following 3 weeks of negotiations.

The areas covered by the agreement are north of 27° N. latitude and east of a line extending approximately 50 miles off the Chinese mainland. In those areas, the agreement provides, among other things, for six fishing zones where a limited number of fishing vessels from both countries may fish, and emergency ports of call for distressed fishing vessels of both countries. In the fall of 1965, Japan was reported to have 760 dragnet vessels and 20 trawlers operating in the area covered by the agreement.

The new agreement calls for a tightening of fishery regulations on mesh sizes, minimum fish size, and catch composition. It also provides for extending eastward regulatory areas 1 and 2 to a distance of 15 miles, mainly for the purpose of protecting shrimp resources. The number of vessels, both Japanese and Chinese, that can operate in the restricted areas remains the same. (The Japan Economic Journal, December 28, 1965; Suisan Tsushin and Suisan Keizai Shimbun, December 20, 1965; and other sources.)

Note: See Commercial Fisheries Review, Dec. 1965 p. 70; Jan. 1965 p. 85; Jan. 1964 p. 61.

FISHERIES AGENCY BUDGET FOR FISCAL YEAR 1966:

The Japanese Cabinet on January 14, 1966, approved a general account budget for fiscal year 1966 (begins April 1) for submission to the Diet (parliament), which convened in late January. Funds requested for the Fisheries Agency, Ministry of Agriculture and Forestry, total 24.2 billion yen (US\$67.2 million),

an increase of 4.0 billion yen (\$11.1 million) or about 20 percent over 1965's regular fishery budget of almost 20.2 billion yen (\$56.1 million). The proposed increase in the fishery budget is considerably higher than any past increases approved by the Cabinet.

Proposed funding for some fisheries programs include:

Program	Proposed 1966 Budget		1965 Budget	
	1,000 Yen	US\$	1,000 Yen	US\$
Improvement of vessel gear and shipboard medical service . . .	38,000	105,556	-	-
Improvement in weather and fishing condition forecasts	29,000	80,556	24,000	66,667
Resource conservation (including water pollution control) . . .	482,000	1,339,000	473,000	1,314,000
Measures to improve marketing of fishery products	351,000	975,000	252,000	700,000
Sea farming development surveys	19,000	52,778	12,000	33,333

New programs in the fiscal year 1966 fishery budget include, among others, extension of a \$14,000 government subsidy to improve medical service aboard fishing vessels engaged in high-seas fisheries, \$83,000 for installation of labor-saving devices aboard the 602-ton government research vessel Shoyo Maru, and \$7,000 for long-line gear research. The proposed budget also includes a large increase in funds for the promotion of frozen fishery products on the Japanese domestic market and a request for additional funds for sea-farm development projects. (Suisan Keizai Shimbun, January 17; Minato Shimbun, January 15, 1966.)



Kenya

FISHERIES PRODUCTION, 1964:

Fisheries Production, 1964			
Area of Production or Product	Quantity	Ex-Vessel Value	
		K£	US\$1,000
Fish:			
Coast	4,652	248,275	6,952
Lake Victoria .	12,000	672,000	18,816
Lake Baringo .	600	18,120	507
Lake Rudolf .	850	4,760	133
Lake Naivasha .	550	18,480	517
Other Lakes . .	350	19,600	549

(Table continued on next page.)

Kenya (Contd.):

Fisheries Production, 1964 (Contd.)			
Area of Production or Product	Quantity	Ex-Vessel Value	
	Metric Tons	K£	US\$1,000
Fish ponds . .	120	13,440	376
Rivers	1,000	44,800	1,254
Total	20,122	1,039,475	29,104
Other Marine Products:			
Oyster meats .	2.5	3,353	94
Oyster shell -- crushed . . .	100.0	2,500	70
Beche-de-mer (Sea cucumber) (fresh weight)	35.4	752	21
Green turtle . .	5.0	168	5
Spiny lobster (crawfish) . .	52.6	10,245	287
Shrimp (prawn)	27.0	2,500	70
Total	222.5	19,518	547
Grand total .	20,344.5	1,058,993	29,651

Note: One Kenya £ equals US\$2.80.



Republic of Korea

TUNA FISHING IN ATLANTIC AND INDIAN OCEANS PLANNED FROM AFRICAN BASES:

Korea plans to set up fishing bases (mainly for tuna) at various African coastal ports, according to the Korea Marine Industry Development Corporation. From those African bases, South Korean vessels would be able to fish extensively for the first time in the South Atlantic and Indian Oceans.

To expand fishery exports, Korea has been making large investments in an offshore fishing fleet. An example is the order for 91 fishing vessels (including 76 tuna vessels and some trawlers) placed by Korea with a French-Italian group. In August 1965, it was announced that half of those vessels would be delivered in 1965 and the remainder in 1966.

Under current proposals, Korea will begin a massive buildup of her fishing fleet with funds provided by Japan under the normalization agreement between the two countries. Some of the funds will also be used to develop Korean processing and canning plants.

Fishery and marine product exports with a total value of US\$29.3 million was South Korea's target in 1965. (United States Embassy, Seoul, December 27, 1965.)



Morocco

CANNERS COMPLAIN ABOUT EXPORT CONTROLS:

Canned fish was among the products placed under the control of the Office de Commercialisation et d'Exportation (OCE) by the July 1965 decrees nationalizing Moroccan exports of food products and handicrafts. Implementing the nationalization of the exports of the canning industry (which in 1964 exported \$26.8 million in canned fish, \$4.2 million in canned fruits and vegetables, and \$3.2 million in canned fruit and vegetable juices) appeared to be less complicated because of the nonperishable nature of the product, the control exercised over the industry by the OCE's predecessor (the Office Cherifien de Control d'Exportation), and the organization of the industry in canners associations. However, in a late 1965 meeting of the Conseil Supérieur de la Conserve, the members decided to send a memorandum of their grievances against the OCE to the various ministers who serve on the governing council of that organization. According to the newspaper, Maroc Informations, the memorandum made the following points:

- (1) The new expenses imposed on the producers despite their protests add to production costs already too high.
- (2) Despite the good intentions of the responsible officials, the administrative regulations which govern the organization do not permit it the flexibility required in commerce or the speed necessary in export operations. For these reasons numerous claims by purchasers are made daily.
- (3) The lack of technical knowledge in certain branches (of the OCE) or the lack of experience results in serious mistakes which harm the foreign customers as well as the canners and damages the good commercial reputation of the Moroccan industry.
- (4) The uncertainty of obtaining a normal profit margin in the canning industry not only will prevent its expansion but will risk checking investments required for modernization already undertaken.

While the situation outlined in the memorandum is perhaps due in part to the initial confusion and administrative problems involved in hurriedly setting up a new organization, the Moroccan canning industry, particularly the fish canners, have been in a

Morocco (Contd.):

precarious state for some years. The additional production costs caused by the OCE have only added to the problems of the fish canners.

According to the weekly, La Vie Economique, the average cost price of packed sardines which make up about 80 percent of the Moroccan canned fish exports is higher than the average world market price. This is brought about by the fact that the price of the fresh fish to the canners is set by the Government on the basis of a fair return to the vessel owners who operate old inefficient boats with excess labor. Labor costs on the fishing vessels and in the canneries are high because of union pressure, which is supported by the Government, to keep employment at maximum levels.

The portion of the sardine pack which is sold at world market prices is thus sold at a net loss to the industry. This loss, however, is more than made up by the sale of an annual duty-free quota to France at the high price of the protected French internal market. Most of the industry is dependent on this French quota which is renewed annually. The quota could, however, be abolished or drastically reduced at any time.

In 1966, the price squeeze on the fish canners is even greater than before since other costs, including the price of cans and the oils used in packing the fish, have risen. In addition, the OCE receives the equivalent of 60 U.S. cents per case of canned fish exported to France and 20 U.S. cents per case on exports to other countries. As a result of these increased costs and delays caused by the newness of the OCE, the latest available statistics show that canned fish exports dropped 36 percent during July-September 1965 as compared to the same period in 1964. According to the OCE's statistics, exports of canned fish during the summer quarter were lower than in any of the past nine years. (United States Embassy, Rabat, Morocco, January 5, 1966.)



New Zealand

JAPAN SEEKS FISHING RIGHTS WITHIN NEW ZEALAND 12-MILE FISHING LIMIT:

The Japanese Government on December 20, 1965, sent a 3-man delegation to New Zealand to seek recognition of Japanese fishing rights within New Zealand's 12-mile fishing limit, which became effective January 1, 1966. About 25 Japanese bottomfish long-line vessels have been fishing for sea bream within 12 miles of New Zealand's coast, and Japanese trawlers have also been operating in adjacent waters since 1960. Japan's position is that she does not recognize any exclusive fishing zone established unilaterally and without arrangements being made with affected countries. However, according to preliminary reports the New Zealand Government has stated that within its 12-mile limits it will not recognize Japanese fishing activities beyond a prescribed time limit. (Suisan Tsushin, December 28, 1965, and Suisan Keizai Shimbun, December 21, 1965.)

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TWELVE-MILE FISHING ZONE CLAIM DISCUSSED WITH JAPAN:

Representatives of the Japanese and New Zealand Government discussed in early January 1966 the question of New Zealand's twelve-mile fishing zone. This zone was established by New Zealand legislation enacted on September 10, 1965, and took effect January 1, 1966. Japanese Government representatives stated that they were unable to recognize the validity of the New Zealand zone in terms of Japan's understanding of international law on such questions. New Zealand representatives reaffirmed New Zealand's view that it is within the sole competence of the coastal state.

The Japanese indicated that they intend to refer the matter to the International Court of Justice in order to resolve the difference of opinion on the the international legal issue. They suggested that this might be done jointly by both governments. It was the New Zealand Government's understanding that the Japanese Government would, as a next step, submit detailed proposals for stating jointly a case to the court. Meantime, provision has been made for continuing consultations through diplomatic channels on the interim situation in order to ensure that the merits of either party's legal position should not be prejudiced and

New Zealand (Contd.):

that the overall friendly relations between the two countries should be preserved. (United States Embassy, Wellington, January 7, 1966.)



Nigeria

SHRIMP FISHERY TRENDS, LATE 1965:

The shrimp resource off Nigeria has attracted a lot of interest. Following is a short summary of recent development projects in this potential fishery:

In the spring of 1964, a trawler working off Nigeria was supplied shrimp trawls (Gulf of Mexico-type) through the cooperative efforts of the U. S. Agency for International Development (AID) and the Food and Agriculture Organization (FAO). The results proved more than satisfactory. The vessel which had been landing from 50 to 100 pounds of heads-on shrimp after a 3-day trip started landing from 1,000 to as high as 2,400 pounds of shrimp in the same length of time at sea. As a result of those catches, shrimp shipments totaling 6,426 pounds were sent to the United States market to test its acceptance. The shrimp was handled through regular trade channels and proved quite acceptable as to taste and appearance. Most of the shrimp caught off Nigeria are of the Penaeus duorarum species and correspond to Gulf of Mexico pink shrimp, according to marine biologists. There have been several types of shrimp trawls used off Nigeria since the initial trials and all have been successful.

Most of the shrimp fishing done during the initial explorations in 1964 was in 12 to 20 fathoms outside of Lagos Harbor, some 20 miles in either direction. Since then the United States trawler Basra, which arrived in January 1965, has found richer shrimp grounds in the delta area off Port Harcourt. Catch rates were as high as 1,500 pounds of heads-off shrimp a night. During the limited explorations from April 1964 to December 1965, there was no appreciable seasonal change in production, but more intensive fishing might reveal a seasonal pattern.

Since the first large catch of shrimp off Nigeria in April 1964, U. S. commercial firms have shown a growing interest in the fishery.

One U. S. firm sent two American shrimp trawlers to explore for shrimp off Nigeria in January 1965. That company plans a shrimp fishing operation off Nigeria in which the catch would be processed at sea aboard freezer trawlers.

Two other U. S. firms were given AID survey grants to study the Nigerian shrimp grounds, and their representatives arrived in the early months of 1965. One of those groups returned in October 1965 to make final arrangements for a joint U. S.-Nigerian company to be located in the Port Harcourt area starting with a nucleus of 10 shrimp trawlers.

Still another large shrimp producer from Tampa, Fla., arrived in October 1965 and spent some time surveying the various Nigerian ports and facilities. The reaction was favorable, and it is expected that an operation by this group will be started soon.

In addition, AID is going ahead with plans to help Nigerians develop a local trawler fleet. Several technicians for the AID project have already been assigned. (United States Embassy, Lagos, December 21, 1965.)



Norway

EXPORTS OF FISHERY PRODUCTS AT RECORD LEVEL IN 1965:

Norwegian exports of fishery products in 1965 had a record high value of about US\$200 million. Production of frozen fishery products and fish meal were up substantially in 1965. Norwegian landings in 1965 totaled more than 2.1 million tons as compared to 1.4 million tons in 1964. Very large catches of herring in the North Sea throughout the second half of 1965 accounted for much of the increase.

Compared with 1964, the export increases in 1965 for the main categories of Norwegian fish products were as follows: fresh, frozen, dried, salted, and smoked fish--23 percent; herring meal--38 percent; other fish meal--31 percent; and hardened fats--18 percent. (The Export Council of Norway, January 1966.)

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EX-VESSEL PRICES FOR INDUSTRIAL FISH IN 1966:

Ex-vessel prices in 1966 for reduction fish (herring and other species) have been agreed

Norway (Contd.):

upon in Norway by representatives of the fishermen and the fish meal and oil industry.

Norwegian Ex-Vessel Prices for Reduction Fish, 1965-1966		
Species	1966	1965
	(US\$ Per Short Ton)	
Fat herring	1/	2/
Winter herring (storsild)	36.66	29.77
Winter herring (vaarsild)	30.59	26.63
North Sea herring	45.40	40.15
Capelin	16.70	12.77
Sandeel	27.31	23.18
Norway pout	25.53	21.46
Mackerel, Jan. 1-Aug. 15	42.16	} 35.22
Mackerel, Aug. 16-Dec. 31	40.26	

1/The 1966 prices for fat herring will, as a change from 1965, be based partly on the fat content of the fish. The basic price in price group I (1-3 herring per kilogram) is set at US\$19.94 per short ton, and in price group II (more than 3 herring per kilogram) at \$18.77 per ton. For each percent of fat exceeding 2.7 percent there will be an additional payment of \$1.52 a ton.

2/Prices not available.

Note: Prices above were originally announced in Norwegian kroner per hectoliter. The prices in dollars per short ton were arrived at by the use of official Norwegian conversion factors (1 krone equals 14 U.S. cents).

The 1966 ex-vessel prices are higher than in 1965.

The year 1965 was a record year for the Norwegian fish meal and oil producers in terms of production as well as sales. In January-October 1965, total deliveries of herring and other fish to the reduction plants reached 1.5 million short tons, or 85 percent more than in 1964. The increase was largely accounted for by record catches of North Sea herring and capelin.

According to official Norwegian trade statistics, 206,900 short tons of herring meal valued at Kr. 235 million (US\$32.9 million) were exported in January-October 1965, or about one-third more in terms of quantity and two-thirds more in terms of value than in 1964. (United States Embassy, Oslo, January 9, 1966.)

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CANNED FISH EXPORT TRENDS, JANUARY 1-OCTOBER 9, 1965, WITH COMPARISONS:

Exports of the principal Norwegian canned fish export items (brisling, small sild, and kippered herring) were about the same during the first three quarters of both 1964 and 1965. But in 1965 stocks were down and fishing for brisling and small sild was disappointing.

During January 1-October 9, 1965, exports of the principal items in standard cases (100 $\frac{1}{4}$ cans) were as follows (comparable 1964 data in parentheses): brisling 311,000 cases (307,000 cases), small sild 640,000 cases (645,000 cases), and kippered herring 206,000 cases (201,000 cases).

During January 1-August 31, 1965, exports of canned crab were 497 metric tons (446 tons in 1964) and exports of canned shrimp were 312 tons (613 tons in 1964).

Pack of canned brisling during January 1-October 9, 1965, was 356,000 standard cases (no change from 1964) and that of small sild was 427,000 standard cases (down 17 percent from 1964).

Stocks of brisling and small sild were short in late 1965. Increasing sales of Norwegian canned brisling over the last several years have cut into carryover stocks, and the 1965 pack of brisling (although about the same as in 1964) failed to meet demand. The brisling fishing season closed October 15, 1965; however, cannery continued to pack brisling from frozen stocks. The small sild fishing season was expected to continue until January 31, 1966, and packers were hoping for some improvement in fishing during the latter part of the season.

The United States was the principal market for Norwegian canned fish exports in the first 8 months of 1965 taking 7,017 tons valued at Kr. 39 million (US\$5.4 million), a gain of 8 percent in quantity and 10 percent in value over the same period of 1964. Other important markets for Norwegian canned fish are Great Britain, continental European countries, South Africa, Canada, and Australia. (Norwegian Canners Export Journal, October and November 1965.)

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COST OF TYPICAL NEW HERRING PURSE SEINER:

Norway's productive North Sea herring fishery has encouraged the construction of many new purse seiners. A typical new Norwegian steel seiner (length 125 feet, breadth 26.5 feet, and depth 13.5 feet with an 800-horsepower diesel engine, sonar, echo-sounder, radar, direction-finder, radiotelephone, winch, and power block) costs about US\$280,000. A towboat and seine skiff with echo-sounder costs \$9,100; two seines cost \$56,000, and a

Norway (Contd.):

fish pump \$11,200. (Dansk Fiskeritidende, December 17, 1965.)

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LONG-LINE BAITING MACHINE DEVELOPED:

A small baiting machine for long-line fishing has been developed by a firm in Stavanger, West Norway, in cooperation with the Chemical-Technical Research Institute of the Norwegian Directorate of Fisheries. Before baiting, the line is coiled up in the machine, and the hooks put into magazines containing 200 each. When the line runs into the water, fish for bait is fed into the machine, and pieces are automatically attached to the hooks as they pass by. Two hooks are baited every second. This allows a vessel to maintain a speed of 6 knots while playing out the long line.

The machine, based on a patented device invented by a fisherman, is said to be of a very simple design which is suitable for all kinds of fishing vessels. (Export Council of Norway.)

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FLOATING PLASTIC FISH CONTAINER TESTED:

Floating plastic fish containers for use by herring fishing vessels to add to their holding capacity (by 46 to 183 metric tons) are being tested by the Central Institute for Industrial Research at Oslo, Norway.

A 46-ton container, which is described as sausage-like, occupies less space than a life raft. If the catch exceeds the carrying capacity of the vessel, the container can be launched filled with fish, kept afloat with compressed air, and towed to the landing place. The first experimental container tested has a capacity for 500 hectoliters (46.2 metric tons) of herring or similar bulk fish. A similar container capable of carrying 2,000 hectoliters (183 metric tons) will also be tested.

If expectations are fulfilled, one of the problems arising during heavy herring fishing off Norway should be solved, as fishermen will be able to make use of excess catches or keep fishing beyond their present limitations.

The 2,000-hectoliter container is to be fitted with a radar reflector or radio beacon, which will direct tugs or transport vessels to the spot where the containers were released after having been filled from the fishing vessels. The tugs might be needed to tow the larger containers because some skepticism has been expressed as to the chances of bringing in a fully loaded purse-seine vessel safely when towing a fully loaded container under rough weather conditions. (World Fishing, December 1965.)



Pakistan

CHINESE TO INCLUDE FISHERY PRODUCTS IN TRADE FAIR:

Chinese Communists plan a "giant trade fair" in mid-March at Karachi, Pakistan. Fishery products will be among the 4,000 items on display. (U. S. Embassy, Karachi, January 14, 1966.)



Persian Gulf

SHRIMP FLEET BUILT IN NORWAY ARRIVES IN PERSIAN GULF:

A complete shrimp fleet, comprising a 177-foot mothership, eight 89-foot trawlers, and a 39-foot exploratory stern trawler, began operating in the Arabian Gulf in late 1965 after an armada-style voyage from Bergen, Norway, to Kuwait.

All eight trawlers in the fleet are fitted with freezing equipment. The mothership, christened the Marzook, supplies them with fuel, water, etc., takes on their frozen catches, and cooks and freezes some of the shrimp in a blast freezer with a capacity of 4 tons in 24 hours. The catches are then loaded aboard a cargo vessel for shipment to foreign markets, mainly in Great Britain and the United States. (Simrad Echo, January 14, 1966.)



Peru

LIBERALIZES LICENSE PERIOD FOR FOREIGN-FLAG FISHING VESSELS:

Supreme Decree No. 16, dated December 28, 1965, liberalizes the period of license

Peru (Contd.):

validity for foreign-flag vessels fishing for Peruvian companies. Under the terms of the decree, licenses for such vessels will be valid to the end of the calendar year in which they are purchased. (U. S. Embassy, Lima, January 6, 1966.)



Philippines

BUY SOUTH AFRICAN CANNED FISH:

Under a purchase agreement concluded at the end of the season, some 70,000 cases of canned sardines had been shipped to the Philippines. According to the Namib Times, the Philippine National Marketing Corporation (NAMARCO) wished to buy considerably more, but the South-West African end-of-season supplies were inadequate. Large orders are expected during the coming season. The periodical speculates that the recent change of Government in the Philippines is unlikely to affect South-West African fish sales to that country as the fish are highly competitive in terms of price and quality.

This is the second large purchase of fish by the Philippines since announcement of a ban on imports from South Africa. In April 1964, the Philippines purchased 875,000 cases. (United States Consulate, Cape Town, December 17, 1965.)



Poland

ATLANTIC TUNA FISHERY NOT PLANNED:

Poland does not now fish for tuna and has only taken a few tuna incidentally while catching other fish. Initiation of tuna fishing, including construction of tuna vessels, was considered during development of the new 5-year fisheries plan

Japanese long-lining techniques and power-block purse-seining were reviewed but both would require learning complex new techniques. At least one Polish fisheries expert considered the labor involved in long-lining unsuited to Polish fishermen. Furthermore, an effort to send a Pole to Japan through FAO to learn long-lining was cancelled by Japanese industry opposition.

Special tuna vessels would have to be constructed. At present there is no tuna vessel building program nor is there one included in the new 5-Year Plan. However, a latent Polish interest in tuna fishing remains. (U. S. Embassy, Warsaw, January 22, 1966.)

Editor's Note: There have been incidental catches of tuna while fishing for herring in the North Sea and possibly off Africa. The Polish state fishery enterprise "Arka" sent a cutter to fish with poles and lines for tuna in the Bay of Biscay in 1960 with unsatisfactory results. Canned tuna available in Poland is mostly imported from Yugoslavia and is not a significant item in domestic fish consumption. The staff of the Sea Fisheries Institute, Gdynia, did much of the background investigation for the tuna project proposed for the new 5-Year Plan.

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CONSTRUCTION AND EXPORT OF FISHING VESSELS:

Polish shipyards built the first vessels for export in 1952. They were conventional B-10 class steam trawlers destined for Soviet owners, each of 450 tons deadweight. Five years later they were replaced by an improved B-14 series, of which 46 units were built by 1961. The heavy and spacious steam engine of the B-10 was replaced in the B-14 by a much smaller diesel engine.

The building of the first factory trawlers and stern trawlers was also undertaken. Polish shipyards have mastered the serial production of large base ships serving as floating warehouses, and workshops as well as the construction of processing factoryships operating with fishing flotillas far away from home ports.

Two Polish shipyards have specialized in the building of fishing vessels. Fishing vessels built in Polish shipyards can be seen more and more frequently in nearly all of the world's fishing grounds. They operate in tropical oceans near African coasts, in the North Atlantic, and in the Caribbean Sea.

According to statistics published by British sources (Lloyd's Register), Poland ranks second in the world for fishing vessel tonnage built, with Japan first. A noticeable percentage of the Polish-built fishing vessels are exported.

Poland (Contd.):

The Import and Export Office for Ships and Marine Equipment (CENTROMOR) of Warsaw has sold 173 vessels over the past 15 years to foreign customers. For several years French owners from the Atlantic ports of Boulogne-sur-Mer, Lorient, and La Rochelle have been regular clients of Polish shipyards, which have built for them B-20, B-21, and B-27 class motor trawlers. (Polish Maritime News, November 1965.)

**Rumania****DISCONTINUES FISHING IN THE NORTHWEST ATLANTIC:**

The large stern trawler Galati came into the port of Casablanca, Morocco, for supplies. The Galati and her sistership Constanta were fishing off the United States Atlantic coast the latter part of 1965. The Galati reportedly caught 500 metric tons of herring as well as some cod while operating on Georges Bank in the Northwest Atlantic. Early in 1966 the Galati was fishing off Morocco's southern coast for mackerel and allied species. (La Peche Maritime, November 1965, p. 841.)

Editor's Note: In January 1966, both of the large freezer stern trawlers, owned by the Rumanian Government, began fishing off western Africa. Both Rumanian trawlers also fished off Africa's west coast between the Tropic of Cancer and the Equator in the spring of 1965. One of them, the Constanta, caught about 2,000 metric tons of fish in one 5-month-long trip and produced 860 tons of edible fishery products and 200 tons of fish meal. In previous trips, the two Rumanian stern trawlers fished near the Faeroe Islands and in the Pacific.

Note: See Commercial Fisheries Review, April 1965 p. 82; July 1964 p. 55; March 1964 p. 67.

**South Africa Republic****MUCH OF 1966 FISH MEAL OUTPUT SOLD IN ADVANCE FOR HIGHER PRICES:**

About 60 percent of expected 1966 fish meal output in the South Africa Republic was sold in advance at prices at least 25 percent above those in 1965, according to an official

in the South African industry. He said that the high prices in the world market were due to uncertainties in the Peruvian outlook. (Namib Times, December 24, 1965.)

**South-West Africa****WHITE FISH INDUSTRY EXPANSION:**

Possibly in response to the rapidly increasing foreign interest in South-West Africa's white fish resources, several South or South-West African companies have indicated plans for exploiting the resource through facilities planned or under construction at Walvis Bay. An article in the Namib Times of November 26, 1965, indicated that among the planned investments in Walvis Bay are: (1) a white fish factory valued at more than US\$4.2 million to be constructed by the Marine Products group; (2) a fish and meat freezing plant to be constructed by a South African company which is already doing experimental trawling off the coast; and (3) construction of a \$350,000 white fish factory by Atlantic Rock Lobster Bpk., subject to the Administration's approval of certain arrangements. According to the article, Atlantic Rock Lobster is seeking permission to use three foreign trawlers with crews to fish for the company. It has also obtained the participation of British interests who will help with technical staff, construction and operation of the factory, the supply of modern machinery, and marketing. Finally, the article noted that an \$85,000 white fish and snoek processing factory owned by Tafelberg Fisheries is already under construction in Walvis Bay. The Walvis Bay Town Council has set aside a number of additional plots of sea frontage for fish-processing factories, indicating that further interest may have been expressed by other South African firms. (United States Consulate, Cape Town, Dec. 17, 1965.)

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VESSEL OWNERS SEEK TO RESTRICT FOREIGN FISHING VESSELS:

In a letter to the Administrator of South-West Africa, the Walvis Bay Boat Owners' Association has suggested that restrictions be applied to foreign trawling operations off the South-West African coast, in order to prevent overfishing beyond the territory's 12-mile fishing limit. Among the suggestions incorporated in the letter were: (1) prevent-

South-West Africa (Contd.):

ing the transshipment of fish by foreign trawlers calling at Walvis Bay; and (2) denying fresh provisions and water at Walvis Bay. The letter culminates a press and public attack on the growing incursions of foreign fishing vessels in the waters off South-West Africa. Although the vast majority of the vessels are believed to fish only white fish, the boat owners' concern seems to center around possible depletion of the pilchard stocks through disruption of their breeding grounds, which lie fairly close to the 12-mile fishing limit. A representative of the South African fishing industry, commenting on the Association's proposals, tended to dismiss them as impractical and ineffective.

According to the periodical Cape Argus (Cape Town, S. Africa) of November 13, 1965, Walvis Bay has become a supply station for fishing vessels from a number of other countries. In addition, crew members of many of the vessels spend considerable sums of money in Walvis Bay for personal needs. Among the nations represented are: Belgium, Israel, Spain, Japan, U.S.S.R., Bulgaria, and Poland. Soviet, Bulgarian, and Polish vessels have been discouraged from visits to Walvis Bay and their frequency of stops had decreased noticeably in late 1965. (United States Consulate, Cape Town, December 17, 1965.)



Thailand

JAPANESE SET UP JOINT SHRIMP ENTERPRISE IN THAILAND:

A Japanese fishing firm and a Thai trading company have agreed to establish a joint shrimp-processing company in Thailand. The Japanese firm will provide technical assistance in the freezing and processing of shrimp and will purchase the frozen shrimp produced by the joint company for export to Japan. It was reported that the Japanese firm hopes to purchase 300-400 metric tons of frozen shrimp a year. The proposed venture was scheduled to begin operations in February 1966. (Suisan Keizai Shimbun, January 17, 1966.)



Tristan da Cunha

TRISTAN DA CUNHA SPINY LOBSTER FISHERY, LATE 1965:

A spiny lobster fishing project and a new harbor should bring important changes to the tiny island of Tristan da Cunha in the mid-South Atlantic where about 260 people live. Many of the islanders are fishermen, but they have been able to push their small dinghies off the rocky beach through the heavy surf only about 40 days a year. The new harbor will extend their fishing season.

The harbor is being provided by the British Government at a cost of about R160,000 (US\$222,000) and should be ready for use about April 1966. Sited on the reef in front of the settlement, the small harbor comprises 2 curving arms, each 60 feet wide at the base, which are 270 feet apart at their shore ends and reach to within 50 feet of each other at the entrance. A depth of water of 9 feet has been provided by blasting out solid rock.

The harbor has made possible a new shore based processing and freezing plant at Tristan, which is being financed by interests in the South Africa Republic. Construction of the new plant had begun in late 1965.

In addition to the shore-based operation, the South African fishing vessels Tristania and Gillian Gaggins are expected to operate offshore from Tristan da Cunha during the main fishing season from September to April, after which they will return their catches to South Africa. (The South African Shipping News and Fishing Industry Review, November 1965.)



Tunisia

YUGOSLAVIA TO CONSTRUCT FISHING PORTS:

A Belgrade construction enterprise, the "Ivan Milutinovic," has contracted with the Tunisian Government for feasibility studies on the construction of two fishing ports. The projected fishing ports will be located in the cities of Sukrin and Sayade on the Mediterranean. (U. S. Embassy, Belgrade, November 16, 1965.)

Editor's Note: In 1962, the Yugoslav Shipyards of Pula delivered five tuna fishing vessels to Tunisia, and they are at present building a series of 10 deep-sea fishing vessels.

Tunisia (Contd.):

In August 1964, the Tunisian state-owned fishing corporation, L'Office National des Pêches, concluded an agreement with the East German Rosslau Shipyards for the construction of 10 steel trawlers to be delivered by the end of 1965.

**U. S. S. R.****PACIFIC OCEAN PERCH LANDINGS:**

Over the past 7 years, Kamchatka fishermen have intensified fishing for ocean perch in the North Pacific and the Bering Sea. In 1959, over 50 percent of Kamchatka's annual catch consisted of flounders; by 1965, ocean perch landings amounted to about 50 percent and flounders only to 8 percent of the total. Kamchatka's herring landings amount to about 50,000 metric tons a year (Kamchatskaia Pravda, January 13, 1966.)

Editor's Note: In 1965, Kamchatka fishermen caught a total of 416,000 metric tons of fish. Ocean perch landings in 1965 were thus in excess of 200,000 metric tons; that species was caught mainly off the Aleutians (with large factory stern trawlers) and in the Gulf of Alaska (with medium and large trawlers). Total 1965 Soviet landings of Pacific ocean perch are estimated at over 400,000 metric tons. Kamchatka fishermen catch flounders mainly in the Bering Sea (off Pribilof Islands); herring is also caught there but even more in the Sea of Okhotsk.

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FLOUNDER EXPLORATIONS IN BRISTOL BAY:

In mid-January 1966, one factory stern trawler (Valerii Bykovskii) and 2 medium trawlers (Krutogorovo and Kekurnii) explored for flounders on the outer Bristol Bay flats north of Unimak Island.

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ESTONIAN FISHERMEN TO FISH OFF ICELAND:

Fishery Administrators of the Estonian Soviet Republic are studying the possibility of fisheries expansion into Icelandic waters. A small fishing fleet was about to sail the latter part of 1965 to this new area which,

according to the Soviets, has not been sufficiently exploited by her fishermen. If the initial exploratory expedition is successful, a larger Estonian fleet will continue to fish on Icelandic banks. As a result, the Estonian fishing operations off the coasts of North America (Georges Bank and Newfoundland) may diminish.

* * * * *

POLAND TO BUILD SOVIET OCEANOGRAPHIC RESEARCH VESSELS:

Polish shipyards at Szczecin will construct nine oceanographic research vessels for the Main Institute of Hydrometeorology of the U.S.S.R. The construction will begin in 1967; at present Polish naval architects are working on the design of the prototype. (Zycie Gospodarcze, December 5, 1965.)

Editor's Note: The new Soviet class of oceanographic research vessels will have these specifications: displacement of 3,550 tons, length exceeding 100 meters (328 feet), a crew of 105 (50 scientists and 55 crew members), and sea endurance of 90 days. This class will be equipped with the latest electronic instruments and will have 23 laboratories as well as auxiliary installations and workshops. The vessels will have reinforced hulls and air-conditioning, enabling them to conduct research both in polar and tropical regions. The range of studies will include hydrology, biology, chemistry, geography, acoustics, and other sciences.

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FISHERY AID TO INDIA:

A three-man team from the Soviet Union arrived in India the latter part of 1965 to study the possibilities of extending technical assistance in the development of Indian marine fisheries. The Soviet team began its studies at Visakhapatnam in the Indian state of Hyderabad, adjacent to the Bay of Bengal. This is the first instance of Soviet fishery aid to India. (U. S. Embassy, New Delhi, November 16, 1965.)

Editor's Note: The Soviet Union began its fishery operations in the Indian Ocean 2 or 3 years ago, and ever since has been on the outlook for possible fishery bases to supply her fleets as well as for marketing outlets for her catches. The process seems to be similar to the one that the Soviets have successfully completed in Africa where, after a few initial years

U.S.S.R. (Contd.):

of independent operations, they have finally concluded trade agreements with coastal African countries delivering fresh and frozen fish for local domestic markets.

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HERRING SALES TO SCOTLAND:

Scottish kippering firms, unable to obtain supplies domestically, bought 300 metric tons of frozen herring from the Soviet Union in 1965. Additional amounts were purchased from Norway. Soviet-caught fish arrived at Aberdeen in the refrigerated fish transport Zelenogorsk at the end of November 1965. The Scottish purchaser stated that Scottish boats had failed to keep his plants supplied adequately since May of 1965, therefore, the plants operated only by purchasing foreign fish. Soviet-delivered fish was caught in the fall of 1965 off the Hebrides. (The Fishing News, November 26, 1965.)

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ANTARCTIC WHALING SEASON, 1965/66:

As in previous years, the Soviet Union is operating four whale factoryships in the Antarctic during the 1965/66 whaling season. Two (Sovetskaia Ukraina and Slava) came from the Soviet Black Sea port of Odessa; one (Iurii Dolgorukii) from the Soviet fishing port of Kaliningrad; and one (Sovetskaia Rossia) from the Far Eastern port of Vladivostok. Because of the smaller Antarctic quota of 4,500 blue-whale units for this season, one of the Soviet whale factoryships will hunt only sperm whales, which are not included in the Antarctic quota agreement. (The Fishing News, November 1965.)

Editor's Note: The Soviets have selected the oldest and least efficient whaling factoryship Slava to hunt sperm whales. The Slava was constructed in 1929 in Great Britain for German whaling interests. She was acquired by the Soviets, and began fishing in Antarctica in 1946.

* * * * *

LIMIT ON SEALING OPERATIONS:

On the recommendation of scientists of the Research Laboratory for Marine Mammals of the All-Union Institute of Fisheries and Oceanography (VNIRO), the Soviet Fisheries Ministry ordered the discontinuation of seal

hunting in the White and the Barents Seas during 1966-1970. The reason for this measure was the decreasing size of seal herds in those areas.

Editor's Note: At the 8th Session of the U.S.S.R.-Norwegian Commission for Sea Mammals, December 1965 in Oslo, the Soviets also asked the Norwegians to restrict their seal hunting operations in the Barents and White Seas.

United KingdomFREEZER-TRAWLER FISHERY TRENDS, NOVEMBER 1965:

In late November 1965, the British 1,750-ton stern-trawler Victory landed a record catch of about 550 long tons of frozen fish at Grimsby. The fish were caught during a 39-day trip to Newfoundland fishing grounds. Over 500 tons of the catch, which was frozen aboard ship in 100-pound blocks and stowed at -20° F., consisted of cod and codling. Most of the catch was frozen heads-on. Similar catches had been landed during other trips by British freezer trawlers.

The Victory is operated by a firm which markets frozen fish on a nationwide basis, and they recently introduced cod in portion form. The skinless and boneless 3-ounce portions are packed in 14-pound cartons. (Fish Trades Gazette, November 27, 1965.)

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DANISH POND TROUT PROMOTED IN GREAT BRITAIN:

A promotional campaign to introduce fresh rainbow trout from Denmark to British consumers is being carried out by a London distributor. Danish trout farms are shipping iced trout (either round or gutted) to selected British wholesalers. The trout are shipped on the same day they are taken live from rearing ponds in Denmark.

Speaking in November 1965, the managing director of the London firm handling the promotional campaign said: "The consumption of trout in Britain at the moment is approximately one fish per head of population per annum. This is a figure that can easily be doubled because of the quality of trout and the fact that it now sells at half the price of a dover sole

United Kingdom (Contd.):

and often almost as cheaply as a herring. Trout is 6d. (7 U.S. cents) a pound cheaper today than a year ago, and I can think of no other wet fish of which this can be said."

The belief that the average family is now more adventurous in its eating habits and will experiment with trout if guided on how it can be used to make interesting meals is the main reason for the promotion. Three-color rainbow trout recipe leaflets have been made available to British retailers. In fact, a number of recipe leaflets are sent with the boxes of trout for retailers to distribute to purchasers. The leaflets are plastic wrapped for protection in transit. (Fish Trades Gazette, November 27, 1965.)



Yugoslavia

FISHING INDUSTRY IN CRISIS:

Because of (1) recent economic reforms which abolished many subsidies to the Yugoslav fishing industry and (2) increased import duties, the planned development of Yugoslav fisheries is being jeopardized. To increase

productivity and obtain the concentration of investment funds, a merger of a number of smaller enterprises into large state-owned fishing corporations is planned (3 of these will fish in the Adriatic, 1 on the high seas). In addition, a Government development plan of 43 billion dinars (US\$38.5 million) is being prepared for the decade 1966-1975. Some of the funds sought will be received from the Government (mostly made up of annual payments by Italy for the use of the Yugoslav side of the Adriatic Sea), and the balance from domestic and foreign banks. (Morsko Ribarstvo, vol. 17, no. 10.)

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INCREASED TUNA CATCHES PLANNED:

The 5-Year Plan (1966-1970), provides for an annual tuna catch of 40,000 metric tons by 1970. All of it will be processed and exported (Morsko Ribarstvo, vol. 17, no. 10).

Editor's Note: In 1964, Yugoslavs caught only 300 tons of bluefin tuna. Plan for 1970 is based on expansion of the Yugoslav Atlantic tuna fleet; three tuna vessels are now under construction at Pula Shipyards.



FISHING VESSEL BUILDERS ADVISED TO STUDY MERCHANT MARINE PRACTICES

The builders of fishing vessels could learn much from studying modern commercial vessels, a Swedish editor told the opening session of the Food and Agriculture Organization's third International Technical Meeting on Fishing Boats, which was held in Goteborg, Sweden, October 23-29, 1965.

The editor, who was formerly a captain of merchant ships, said: "The merchant ships of today are more efficient and cheaper than their predecessors, which means a higher earning capacity. It seems rather odd that--with a few exceptions--similar progress has not been made in fishing boat construction." He named maintenance, rust protection, engineroom layout, the selection of engineroom equipment, economy and management, and automation, as fields in which the fishing industry could learn a great deal from present merchant marine practices.

"Even if the background differs from place to place and from time to time," he said, "the owner of a small merchant vessel and the owner of a fishing vessel have this in common: They operate vessels under severe weather conditions, they have as small crews as possible, and time is always inadequate."



FEDERAL ACTIONS



Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Robert D. McKean, 2056 Encinal Avenue, Alameda, Calif., for the purchase of a used 42.5-foot registered length wood trolling vessel to engage in the fishery for salmon and albacore tuna. Notice of the application was published by the U. S. Bureau of Commercial Fisheries in the Federal Register, January 20, 1966.

Paul C. Smith, 540 South East 4th St., Newport, Oreg. 97365, for the construction of a new 50-foot steel vessel to engage in the fishery for salmon, crab, shrimp, and tuna. Notice of the application was published in the Federal Register, January 25, 1966.

Wayne A. Murphy, Box 331, Homer, Alaska, 99603, and Charles H. Nims, Box 701, Kodiak, Alaska 99615, for the purchase of a new 58-foot steel vessel to engage in the fishery for king crab and salmon. Notice of the application was published in the Federal Register, January 29, 1966.

Lee G. Andrich, Box 1563, Kodiak, Alaska 99615, for the purchase of a used 96.7-foot registered length wood vessel to engage in the fishery for king crab. Notice of the application was published in the Federal Register, January 29, 1966.

Edsel J. Williams, P. O. Box 1318, Homer, Alaska 99603, for the construction of a new 32-foot seine vessel to engage in the fishery for salmon and Dungeness crab in the Cook

Inlet area of Alaska. Notice of the application was published in the Federal Register, January 29, 1966.

William Rose Conley, Jr., Box 137, Wakefield, R. I. 02880, for the purchase of a used 51.7-foot wood vessel to engage in the fishery for red hake and miscellaneous species for industrial uses, groundfish, butterfish, flounders, and scup. Notice of the application was published in the Federal Register, February 1, 1966.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).
Note: See Commercial Fisheries Review, February 1966 p. 89.

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HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Maine Marine Products, Inc., Union Wharf, Portland, Maine, has applied for a fishing vessel construction differential subsidy to aid in the construction of a 90-foot overall steel vessel to engage in the fishery for groundfish, whiting, swordfish, scallops, lobsters, shrimp, tuna, sharks, mackerel, flounders, and other flat fish, herring, and herring-like fish, and miscellaneous species for industrial use. A hearing on the economic aspects of this application was scheduled to be held. The U. S. Bureau of Commercial Fisheries published the notice of the hearing in the January 13, 1966, Federal Register.

Hercules Fishing Products, Inc., 37 Laurel St., Fairhaven, Mass., has applied for a fishing vessel construction differential subsidy to aid in the construction of a 88-foot overall wood vessel to engage in the fishery for scallops, groundfish, flounder, swordfish, and lobsters. A hearing on the economic aspects

of this application was scheduled to be held. Notice of the hearing appeared in the January 20, 1966, Federal Register.



Small Business Administration

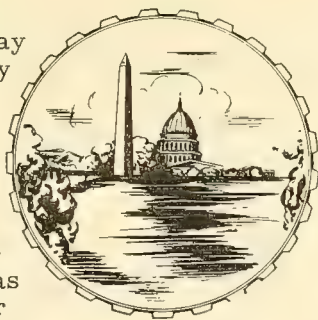
LOAN FOR HAKE REDUCTION PLANT IN ABERDEEN, WASHINGTON:

A Small Business Administration (SBA) loan of \$350,000 for a new hake-processing plant in Aberdeen, Wash., was announced on December 29, 1965. The loan will help Pacific Protein, Inc., equip a plant to produce meal, oil, and other products from hake. Private investors plan to supplement the loan with \$200,000 capital. They expect the plant to be in operation by spring 1966 and to employ 40 people. (Seattle Post-Intelligencer, December 30, 1965, and other sources.)



Eighty-Ninth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.



BUDGET: Both Houses Jan. 24, 1966, received the President's message (H. Doc. 335) transmitting his budget proposals in the amount of \$112.8 billion for fiscal year 1967; referred to Committee on Appropriations. The text of the message is printed in Congressional Record, Jan. 24, 1966 (pp. 857-864).

The Budget of the United States Government, fiscal year ending June 30, 1967, 89th Congress, 2nd Session, House Document No. 335, Part 1, 449 pp., printed, and Part 2, 1308 pp., printed. Contains Budget Message of the President, summary tables and statistical information, and various special analyses.

FISH PROTEIN CONCENTRATE PLANTS: H. R. 12269 (Rivers of Alaska) introduced in House Jan. 24, 1966, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration

plants, practicable and economic means for the production by the commercial fishing industry of fish protein concentrate; to Committee on Merchant Marine and Fisheries. Similar to S. 2720.

FOOD IRRADIATION PROGRAM: Rep. Bates spoke in the House Feb. 8, 1966, concerning recent notoriety in the news media given to the results of experimentation carried out under a Cornell-sponsored study on the effects of irradiated sugar solution on the growth of certain plant cells. He stated that this unfavorable publicity has placed unwarranted damage on the food irradiation program--an approach which may result in significant savings in crops, marine products, meats, and other foods at a time when the world as a whole is facing tremendous shortages. He inserted in Congressional Record, Feb. 8, 1966 (pp. 2368-2369) the referenced news article, together with letters from the Atomic Energy Commission and the Food and Drug Administration on this subject, which were received by the Joint Committee on Atomic Energy.

FUR SEAL CONSERVATION AND PRIBILOF ISLANDS ADMINISTRATION: Hearings have been scheduled for Feb. 18, 1966, before the Senate Commerce Committee on S. 2102, to protect and conserve the North Pacific fur seals, and to administer the Pribilof Islands for the conservation of fur seals and other wildlife, and for other purposes.

METRIC SYSTEM STUDY: House received Senate-passed S. 774 (Pell) to authorize the Secretary of Commerce to make a study to determine the advantages and disadvantages of increased use of the metric system in the United States, and on Jan. 17, 1966, bill was referred to the House Committee on Science and Astronautics.

House Committee on Science and Astronautics, Jan. 18, 1966, met and ordered reported favorably to the House, S. 744 (amended), to provide that the Department of Commerce shall conduct a program of investigation, research, and survey to determine the practicability of the adoption by the United States of the metric system of weights and measures.

NATIONAL SEA GRANT COLLEGES AND PROGRAM ACT OF 1965: Introduced in House, H. R. 12138 (Tupper) Jan. 18, 1966, H. R. 12291 (Dingell) Jan. 25, H. R. 12337 (St. Germain) Jan. 26, and H. R. 12350 (Don H. Clausen) Jan. 27, to amend the National Science Foundation Act of 1950, as amended, so as to authorize the establishment and operation of sea grant colleges and programs by initiating and supporting programs of education, training, and research in marine sciences and a program of advisory services relating to activities in the marine sciences, to facilitate the use of the submerged lands of the Outer Continental Shelf by participants carrying out these programs, and for other purposes; to the Committee on Science and Astronautics. Similar to S. 2439.

NATURAL RESOURCES DEPARTMENT: Sen. Moss in Congressional Record, Feb. 4, 1966 (pp. 2085-2093), highlighting some of the developments in the water field pointed out that he feels his two bills should be passed if we are to find new sources of clean water and assure orderly and wise management of the water resources we already possess. The bills are S. 2435, which would establish a Department of Natural Resources, and S. Con. Res. 55, which expresses the sense of Congress that the U.S. Government refer the so-called NAWAPA (North American Water and Power Alliance) project to the International Joint Commission for study and an en-

gineering survey. He also inserted in the Record, numerous letters and editorials concerning water resources.

NORTHWEST ATLANTIC FISHERIES ACT OF 1950: S. 2847 (Magnuson) introduced in Senate, Jan. 29, 1966, to amend the Northwest Atlantic Fisheries Act of 1950 (Public Law 845-81); to Committee on Commerce. Sen. Magnuson inserted in Congressional Record, Jan. 28, 1966 (p. 1331), a letter dated Nov. 26, 1965, from the Assistant Secretary for Congressional Relations of the Department of State requesting the proposed legislation. At one point in the letter it was stated that the act presently is concerned only with the conservation of fish and shellfish. Proposed amendment would include the conservation of the harp and hood seals.

OCEANOGRAPHY: Rep. Hanna in extension of remarks Congressional Record, Jan. 20, 1966 (p. A258), inserted in the Record an article published in the Jan. edition of the organization organ called V. F. W. by Mr. Kenneth Wilson, titled "The Threat From Below: Russia Far Ahead of United States in Exploring the Bottom of the Ocean."

Rep. Van Deerlin inserted in Congressional Record, Jan. 27, 1966 (p. A392), a resume from the Jan. 22, 1966, Christian Science Monitor, titled "California Aids Study of Ocean," by Kimmis Hendrick.

Sen. Magnuson spoke in the Senate calling for more attention in the field of ocean exploration. He inserted in Congressional Record, Feb. 7, 1966 (pp. 2179-2181), an address given by Comdr. Scott Carpenter, Nov. 16, 1965, before the National Press Club, titled "Sea Lab II."

Rep. Rogers in extension of remarks Congressional Record, Jan. 25, 1966 (pp. A337-A339), requested that the address of Rep. Karth of Jan. 18 before the National Space Club, titled "Potential of Oceanography" be inserted in the Record.

OYSTER ENEMY--MSX: Rep. Fallon in extension of remarks inserted in Congressional Record, Feb. 2, 1966 (pp. A449-A450), an article from the Baltimore Sunday Sun, titled "Deadly New Enemy of the Oyster," by James F. Waesche. The article describes the appearance of the bacteria, MSX, destroying oysters and, possibly, other seafood. Also points out the urgency and the necessity for an overall survey of the Chesapeake Bay area.

PESTICIDES STANDARDS OF NONPERSISTENCE: H. R. 12163 (Fogarty) introduced in House, Jan. 19, 1966, to require certain standards of nonpersistence of synthetic pesticides, chemicals (economic poisons) manufactured in the United States or imported into the United States; to Committee on Interstate and Foreign Commerce. Similar to H. R. 6186.

SALMON CANNERY--INDEBTEDNESS OF ANGOON, ALASKA: S. 2862 (Gruening) introduced in Senate Feb. 2, 1966, H. R. 12735 (Rivers of Alaska) introduced in House Feb. 29, to release the community of Angoon, Alaska, from certain indebtedness; to Committee on the Judiciary. Sen. Gruening in Congressional Record, Feb. 2, 1966 (pp. 1806-1807), pointed out that this bill would allow the Secretary of the Interior to release the people of Angoon from the debt they owe for loans made in 1948 for the operation of a salmon cannery, which was destroyed by fire in 1961, thereby losing any possibility of eventually recouping and oper-

ating profitably. He also inserted in the Record a resolution of the Angoon Community Association urging that Congress pass legislation to relieve the Angoon Community Association of the obligation to pay to the Federal Government loans made for the operation of the cannery and for the purchase of fishing boats.

STATE OF THE UNION MESSAGE: H. Doc. 321: Message from the President of the United States, transmitting, State of the Union Message--The Address of the President of the United States; referred to the Committee of the Whole House on the State of the Union, House of Representatives, 89th Congress, 2nd Session, Jan. 12, 1966, 11 pp. printed.

U. S. FISHERY INDUSTRY REVIEW: Sen. Bartlett, Feb. 7, 1966, spoke in the Senate concerning the important past 5 years of the U. S. fishing industry during which time the Congress has authorized research and development projects and programs to encourage modernization of our fishing fleet, in addition to enacting legislation affecting relations with foreign fishing interests. He inserted in Congressional Record, Feb. 7, 1966 (pp. 2111-2116), a speech he made Jan. 15, 1966, before the Petersburg Chamber of Commerce, titled "The U. S. Senate and the U. S. Fisheries--A 5-Year Review" and the "Summary of U. S. Fishery Legislation."

U. S. FISHING BOAT SEIZURES: Rep. VanDeerlin in extension of remarks Congressional Record, Feb. 7, 1966 (pp. 2320-2321), spoke in the House concerning the recent illegal seizures of U. S. flag vessels which were engaged in lawful pursuits in open waters. The nations concerned are Chile, Ecuador, Peru, and Colombia. The vessels concerned are a purse seiner which was illegally taken from the high seas and held in a Colombian port; and tuna boats operating off the west coast of South America, and taken into the ports of South American countries. He states that methods of persuasion and argument used by the State Department have often proved unavailing; that the time has come for consideration of methods stronger than mere persuasion, methods that will serve to convince every nation that while the United States will scrupulously regard the rights of others on the high seas, we will insist that others give equal regard to our own rights.

WATER POLLUTION: Sen. Douglas inserted in Congressional Record, Jan. 19, 1966 (pp. 563-567), a series of articles which have appeared in several newspapers, written by Sen. Nelson, on our nationwide pollution problem. This series of articles explains the way in which pollution is ruining our fresh water assets, killing our fish, and threatening our municipal water supplies. The articles cover various types of pollution from municipal sewage, industrial wastes, pesticides, septic tanks, detergent chemicals, and ships; and contains a suggested new approach to pollution prevention.

Sen. Dorn inserted in Congressional Record, Feb. 7, 1966 (pp. 2295-2296), a speech delivered by Rep. Blatnik on Feb. 7, 1966, in Washington, D. C., before scientists and executive offices of the major chemical industries, titled "Water--Master or Servant."

Sen. Nelson inserted in Congressional Record, Feb. 8, 1966 (pp. 2450-2451), an article from the Feb. 6, 1966 Washington Star, titled "Tests Hint New Detergent Hits Fish Harder Than Old," by Orr Kelly.

Rep. Grabowski inserted in Congressional Record, Feb. 8, 1966 (pp. A598-A599), the covering statement

that accompanied a report recently received in House, titled "Interim Report of the International Joint Commission, United States and Canada, on the Pollution of Lake Erie, Lake Ontario, and the International Section of the St. Lawrence River," by Hon. Matthew E. Welsh, chairman of the U. S. section of the Commission.

WATER POLLUTION CONTROL AMENDMENT: Introduced in House, H. R. 12166 (McCarthy) Jan. 19, 1966, H. R. 12243 (Bingham) Jan. 24, H. R. 12533 (Murphy of N. Y.) Feb. 3, and H. R. 12734 (Resnick) Feb. 9, to amend the Federal Water Pollution Control Act to increase by \$750 million the authorization of appropriation for the fiscal year of 1967, and to authorize payment to be made to States for retirement of certain bonds; to Committee on Public Works. Sen. McCarthy pointed out in Congressional Record, Jan. 19, 1966 (p. 531), that his bill would permit the State to recapture half the funds on waste treatment projects where they provide 60 percent (30 percent, State share; and 30 percent, prefinanced Federal share).

H. R. 12454 (Conte), H. R. 12456 (Horton), H. R. 12457 (Mathias), and H. R. 12458 (Morse) introduced in House, Feb. 2, 1966, to amend section 8 of the Federal Water Pollution Control Act to provide for increased grants for construction of treatment works; to Committee on Public Works.

S. 2851 (Kennedy of Mass.) introduced in Senate Jan. 28, 1966, to amend the Federal Water Pollution Control Act with respect to grants for construction of treatment works; to Committee on Public Works.

WATER PROJECT RECREATION ACT: The Senate received a concurrent resolution from the Legislature of the State of South Dakota relating to the benefits of outdoor recreation facilities and fish and wildlife enhancement in connection with water resources projects. The resolution was referred to the Committee on Interior and Insular Affairs.

WORLD HUNGER ACT OF 1966: H. R. 12375 (Stalbaum) introduced in House Jan. 27, 1966, to amend the Agricultural Trade Development and Assistance Act of 1954; to Committee on Agriculture. Rep. Stalbaum pointed out in Congressional Record, Jan. 27, 1966 (pp. 1310-1314), that his bill revamps our food-for-peace approach among the countries of the world. He also stated that the bill contains four main categories: (1) the development of capital agricultural and agri-business facilities, (2) the improvement of production methods, (3) the conducting of research and study, and (4) the coordination of our activities with others interested in the same objective. He also stated that research in related areas, such as marine sources, cannot be overlooked in this crucial war on hunger.

S. 2826 (Mondale) introduced in Senate, Jan. 26, 1966, to amend the Agricultural Trade Development and Assistance Act of 1954, as amended, in order to encourage and stimulate increases in the food and agricultural production of developing nations receiving assistance under such act, to facilitate increased United

States efforts to meet the threat of growing human hunger and malnutrition, and for other purposes; to Committee on Agriculture and Forestry. Similar to H. R. 12375. Sen. Mondale in Congressional Record, Jan. 26, 1966 (pp. 1116-1118), pointed out that this bill is directed toward the objective expressed by President Johnson in his State of the Union message, to reshape and expand our food-for-peace program. Would establish a new category of loans and grants to promote programs devoted specifically to improvement of food production and distribution in the friendly nation from which the foreign currency was obtained. One of the programs cited was the development of commercial fishing fleets. Would also establish binational foundations for improving food and agricultural production. Would eliminate the general requirement that food used in this program must be in surplus, and it would create a Cabinet-level policy council to recommend broad levels of food and agricultural assistance which would best further the foreign policy objectives of the United States.

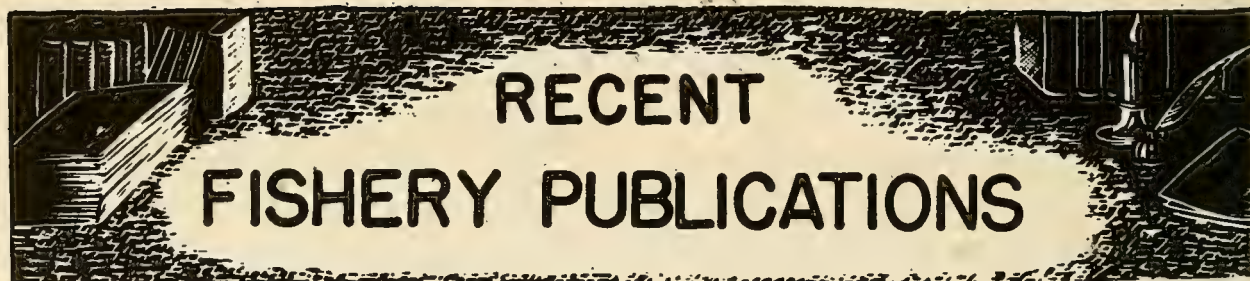
(First Session)

EXPORT EXPANSION ACT: Export Expansion: Hearings before the Committee on Commerce, United States Senate, 89th Congress, 1st session on S. 558, a bill to authorize the Secretary of Commerce to carry out certain programs to develop and expand foreign markets for United States products, and to provide more effectively for assistance in the financing of certain foreign sales which are affected with the national interest, Mar. 17, 18, and 19, 1965, Serial No. 89-35, 280 pp., illus., printed. Contents include various agency comments, statements, letters and wires of various Federal officials, members of Congress, representatives from various business firms.

FOOD IRRADIATION PROGRAM: Radiation Processing of Foods: Hearings before the Subcommittee on Research, Development, and Radiation of the Joint Committee on Atomic Energy Congress of the United States, Eighty-Ninth Congress, 1st session, on Radiation Processing of Foods, June 9 and 10, 1965, 826 pp., illus., printed. Contents include statements and correspondence from various Federal officials, doctors, and representatives of business firms. One section of the report deals with "Marketing Feasibility Study of Radiation Processed Fishery Products," prepared by the United States Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries. It also includes a report "Irradiation Nears Reality--Pilot Plant Will Pioneer Processing, Shipping, and Marketing of Irradiated Seafoods," by Joseph W. Slavin, Bureau of Commercial Fisheries, and P. Miller, Associated Nucleonics, Inc. Fish meal is included in the study of the economics of controlling *Salmonellae* in foods by the use of ionizing radiation.

NOTE: REPORT ON FISHERY ACTIONS IN FIRST SESSION OF 89TH CONGRESS: The U. S. Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL-3--"Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 N. Fort Meyer Drive, Rm. 510, Arlington, Va. 22209.





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| CFS-4004 | - Florida Landings, November 1965, 8 pp. |
| CFS-4006 | - Shrimp Landings, June 1965, 5 pp. |
| CFS-4010 | - Texas Landings, October 1965, 3 pp. |

Sep. No. 752 - Trawl Cod-End Mesh Size Selectivity Toward Yellow Perch in Lake Erie.

Sep. No. 753 - Skipjack Tuna (*Katsuwonus pelamis*) Resources of the Trust Territory of the Pacific Islands.

Sep. No. 754 - Equipment Note No. 18--A Nekton Ring Net Sampler for Use Aboard Oceanographic Research Vessels.

Sep. No. 755 - Review of U. S. Menhaden Industry, 1965.

SSR-Fish. No. 520 - Bait Shrimp (*Penaeus duorarum*) in Tampa Bay, Florida--Biology, Fishery Economics, and Changing Habitat, by Carl H. Saloman, 19 pp., illus., October 1965.

SSR-Fish. No. 521 - Bureau of Commercial Fisheries Symposium on Red Tide, by James E. Sykes, 11 pp., September 1965.

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE FROM THE U. S. BUREAU OF COMMERCIAL FISHERIES, TROPICAL ATLANTIC BIOLOGICAL LABORATORY, 75 VIRGINIA BEACH DRIVE, MIAMI, FLA. 33149.

On the Tunas of Angola, by H. Vilela and R. Monteiro, Translation No. 5, 40 pp., 1965. (Translated by John P. Wise from the Portuguese, *Boletim da Pesca*, Lisbon, Portugal, Ano XII, no. 64, pp. 11-54 (1959). The first two parts in a series of studies on the biology and fishery of the tunas off the west coast of Africa, sponsored by the Marine Biology Mission of the Overseas Department, Government of Portugal. Part I of this report deals with the methods of the commercial fishery and the catch of tuna off the coast of Angola. Part II deals with the biometry of *Neothunnus albacora* (Lowe), the name used throughout the report for yellowfin tuna.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, November and December 1965, 16 and 18 pp., respectively. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tuna-like fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, November 1965, 10 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif.

92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Gulf of Mexico Monthly Landings, Production and Shipments of Fishery Products, November and December 1965, 9 pp. each. (Market News Service, U. S. Fish and Wildlife Service, Rm. 609, 600 South St., New Orleans, La. 70130.) Gulf States shrimp, oyster, finfish, and blue crab landings; crab meat production; LCL express shipments from New Orleans; wholesale prices of fish and shellfish on the New Orleans French Market; Gulf menhaden landings and production of meal, oil, and solubles; fishery imports at Mobile, Ala., Morgan City and New Orleans, La., Miami, Fla., and Houston, Port Isabel, and Brownsville, Tex.; and sponge sales; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, November and December 1965, 4 pp. each. (Market News Service, U. S. Fish and Wildlife Service, P. O. Box 447, Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower North Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, November and December 1965, 21 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, and Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--November 1965, 18 pp. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, November and December 1965, 8 pp. each. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported

through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

AFRICA:

Articles from Industrias Pesqueras, vol. 39, no. 921, September 1965, illus., printed, single copy 50 ptas. (about US\$0.85). Industrias Pesqueras, Apartado 35, Policarpo Sanz, 21-3, Vigo, Spain:

"Campana de un buque aleman de investigacion en las costas de Africa occidental" (Investigations of a German exploratory vessel on the West African Coast), p. 405.

"Los flotas del Atlantico Africano" (The African Atlantic fleets), pp. 406-407.

ALGAE:

An Introductory Account of the Smaller Algae of British Coastal Waters. Part V. Bacillariophyceae (Diatoms), by N. I. Hendey, Fishery Investigations, Series IV, xxii + 317 pp., plates I-XLV, illus., printed, 1964, £9 (about US\$25). Her Majesty's Stationery Office, London, England. (For sale by Sales Section, British Information Service, 845 Third Ave., New York, N. Y. 10022.)

ANCHOVY:

"Tecnico Conserveras; Proceso de fabricacion de las conservas de anchoa" (Canning technique--anchovy canning method), article, Industria Conservera, vol. 31, no. 315, September 1965, pp. 247-250, printed in Spanish, single copy 25 ptas. (about US\$0.40). Union de Fabricantes de Conserveras de Galicia, Calle Marques de Valladares, 41, Vigo, Spain.

ARGENTINA:

Publications, processed in Spanish, available from Departamento de Investigaciones Pesqueras, Direccion General de Pesca, Secretaria de Estado de Agricultura Ganaderia, Buenos Aires, Argentina:

La Pesca de la Merluza en el Mar Argentino, Durante el Ano 1963, Areas de Captura y Rendimientos (The Fishery of Hake in the Argentine Sea During 1963, Areas of Capture and Yield), by Luis Vazquez and others, 22 pp., 1964.

Produccion Pesquera Argentina, Primer Semestre 1965 (Argentine Fishery Production, First six months 1965), 15 pp., September 1965.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

AUSTRALIA:

Articles in Australian Fisheries Newsletter, vol. 25, no. 1, January 1966; Fisheries Branch, Department of Primary Industry, Canberra, Australia: "Fish production declines," p. 6; "Exports and imports rise," p. 7; "Tuna purse-seined in New South Wales," p. 9; "Scallops boost Victorian production," by A. Dunbavin Butcher, pp. 16-17; "CSIRO's fisheries research program," by G. L. Kesteven, pp. 22-23; and "Pearling industry progress," p. 29.

Oceanographical Cruise Reports: Oceanographical Observations in the Indian Ocean in 1963, H. M. A. S. "Diamantina," processed, 1965; Division of Fisheries and Oceanography, Commonwealth Scientific and Industrial Research Organization (CSIRO), Melbourne, Australia:

No. 23 - Cruise Dm 1/63, 175 pp.

No. 24 - Cruise Dm 2/63, 153 pp.

BILLFISH:

"Maryland billfishes," by Frank Schwartz, article, Maryland Conservationist, vol. XXXVIII, no. 4, July-Aug. 1961, pp. 20-24, illus., printed, single copy 25 cents. Maryland Conservationist, State Office Bldg., Box 231, Annapolis, Md.

BONITO:

"Tecnica Conservera--bonito, diagrama del proceso del recorrido" (Canning technique--bonito, diagram of processing line), article, Industria Conservera, vol. 31, no. 314, August 1965, pp. 218-223, printed in Spanish, single copy 25 ptas. (about US\$0.40). Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain.

CANADA:

Circular No. 7 (a collection of six short articles specially written for freshwater fishermen), 43 pp., illus., printed, September 1965. Fisheries Research Board of Canada, Biological Station and Technological Unit, London, Ontario. Among the articles included are: "The Keeping Qualities of Fish Sauces and Wieners," by A. S. Bogoslawski; "A New Method of Identifying Various Species of Fish," by J. F. Uthe; "Preparation for the Advance of Sea Lamprey Control from Lake Superior into the Lower Great Lakes," by J. J. Tibbles; "A Method for Chilling Bulk Quantities of Freshwater Smelt," by A. W. Lantz; and "Air-Blast Freezers for Freshwater Fish," by A. W. Lantz.

"Coast to coast expansion launched by Fisheries Research Board," article, Trade News, vol. 18, no. 4, Oct. 1965, pp. 3-5, illus., printed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada.

CATFISH:

"Catfishes," by Frank Schwartz, article, Maryland Conservationist, vol. XXXVIII, no. 5, Sept.-Oct. 1961, pp. 21-26, illus., printed, single copy 25 cents. Maryland Conservationist, State Office Bldg., Box 231, Annapolis, Md.

CONSERVATION:

Illinois Resource Management--Fish Conservation Teacher's Manual, by Alvin C. Lopinot, 94 pp., illus., printed, 1965. Division of Conservation Education,

Office of Superintendent of Public Instruction, Department of Conservation, 316 South Second St., Springfield, Ill. 62706. A comprehensive educational program includes learning about the conservation and use of resources. With the increase in population and the recent trend toward enjoyment of the outdoors, it is important that students and adults become knowledgeable about fish conservation. This bulletin contributes to that goal. The author gives a history of fish conservation in Illinois, and discusses limnology--the science which deals with the study of lakes and streams--and fishery biology. A few of the more important, most common, or unusual fish in Illinois are described briefly to show their habits, distribution, and economic value. Fisheries management, pollution, commercial and sport fishing, bait minnow propagation, and lake construction are also discussed.

CUBA:

Articles from Mar & Pesca, vol. 1, Oct. 1965, illus., printed in Spanish, annual subscription \$3.50. Mar & Pesca, Amargura y San Ignacio, Havana, Cuba:

"Un futuro en el mar" (A future in the sea), by R. Bofill, pp. 30-33.

"El puerto pesquero base de la abundancia" (The fishing port as a fount of plenty), by Jose R. Savall, pp. 17-19.

DIRECTORIES:

Fisheries Year Book and Directory, 1965-66, 471 pp., illus., printed, £2 (US\$5.60) postpaid. British-Continental Trade Press Ltd., 222 Strand, London WC2, England. Contains concise summaries of 1964 fishery landings, processing, and other developments in Japan, U.S.S.R., Peru, the United States, Canada, the United Kingdom, Norway, South Africa, France, Germany, Poland, and 27 other countries. A chapter titled "Fishing Vessel Construction and Equipment" reviews developments in that field and lists fishing vessels completed or on order during 1964 in major fishing countries. Another chapter on "Research Results and Progress Report" (1) reviews the condition of fish stocks exploited by Great Britain; (2) describes British research on fishing gear, marine biology, and fish farming; and (3) reports on British studies on fresh fish handling, fish freezing, and processing being carried out at the Torry Research Station (Aberdeen) and the Humber Laboratory (Hull). Other articles discuss (1) developments in fish meal and oil, and (2) fish freezing, storage, transport, and merchandising. Includes a dictionary of fish names in eight languages; a fish supply calendar; a list of fishery organizations and trade associations throughout the world; a list of trade journals of interest to the fishing industry; a world directory giving the particulars of thousands of firms, including fishing companies, wholesalers, exporters, importers, canners, firms dealing in fish byproducts, suppliers of machinery and equipment, shipbuilders, marine outfitters, and cold-storage and transport firms; a list of newly introduced trademarks and brands; and a classified guide for buyers. An unusual feature is a photographic plate showing new postage stamps with fish designs issued during 1964.

--Henry R. Beasley

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EAST GERMANY:

Zeitschrift für Fischerei und Deren Hilfswissenschaften, vol. 13 N. F., no. 1/2, 1965, 164 pp., illus., printed in German with English abstracts. Deutsche Akademie der Landwirtschaftswissenschaften zu Berlin, Berlin, German Democratic Republic. (Available from Neumann Verlag, Dr. Schmincke Allee 19, Radebeul 1, German Democratic Republic.) Some of the articles are: "Der Meeresfischfang und die mit ihm verbundene Fischereiwissenschaft in Bulgarien" (Bulgarian sea fisheries and fishery investigations), by P. Kolarov; "Der Bewuchs an Ostsee-Fischkuttern" (Investigations of ship fouling organisms of Baltic Sea fishery cutters), by H. J. Subklew and S. Schulz; and "Vergleichende Untersuchungen über die Einwirkung verschiedener Herbizide auf submerse Pflanzen und Algen unter Laboratoriumsbedingungen" (Comparative research of the effect of various herbicides on submerged plants and algae under laboratory conditions).

ELECTRICAL FISHING:

Einführung in die Elektrofischerei (Introduction to Electrical Fishing), by Paul F. Meyer-Waarden, Inge Halsband, and Egon Halsband, 304 pp., illus., printed in German, 1965, DM 24.60 (about US\$6.50). Westliche Berliner Verlagsgesellschaft Heenemann KG, 1 Berlin 31 (Wilmersdorf), German Federal Republic. The authors of this book are fishery biologists and physiologists in the Institute for Fisheries Research of the Federal Republic of Germany. They report on their 10 years of studies in the field of electrical fishing. The book has information of interest to professional personnel working in this field and also for practical use by laymen faced with different types of problems in catching or controlling various aquatic species. After an introduction and definition of some of the technical concepts involved, the authors go into some detail about the fundamental principles involved in the application of electrical current to fish. For example, chapter 3 contains, among other things, the mathematical formula which has been developed to precisely determine the varying amounts of current required to shock fish of different sizes. The effect on the metabolism of fish when electrical current passes through them is given as well as differences in salt water and fresh water application of this process. The limits on pulse rates and the narcotizing pulse rate for different species of fish are listed and many other fundamental principles applicable in this field are discussed. There follows a short chapter on the possible uses of electrical fishing devices for attracting, repelling, stupefying, or killing fish. Various conditions for use or application of the process are given, such as, selecting out predators from an area inhabited by different species, catching fish which evade conventional types of gear, directing fish away from turbines, etc. Other situations applicable to both fresh- and salt-water fishery resources are mentioned. Following this there is a lengthy chapter describing the various kinds of electrical fishing gear which have been used and are available. Manufacturers names are also indicated and many excellent photographs of the actual devices are shown. The application of appropriate gear for attracting as well as repelling fish is described and the application of the appropriate gear for fresh-water and salt-water operations is also

given in quite some detail. The proper application dependent on the species is also described and runs the range from sardines to whales, including certain shellfish such as crabs. Other possibilities for use of the gear are cited. The authors indicate possibilities for use in capturing crocodiles and also inhibiting the growth of bacteria, particularly in certain foods. The special and more difficult conditions one faces in using the gear in fresh water are treated in a special chapter devoted to this subject. The care and the upkeep of the equipment when used in freshwater areas are discussed. Some general description of specifications for construction and operation of such equipment are given. In addition there is a chapter on the safety requirements which must be observed in order to protect personnel operating such gear. The final chapter cites laws and regulations concerning the operation of electrical fishing devices in various jurisdictions of the Federal Republic of Germany, including provincial laws and regulations. A somewhat lengthy bibliography is provided which reveals the extensive work conducted earlier. The book, in addition to reflecting much of the authors' original work also draws together much which is useful from earlier sources. A glossary of technical terms is given in German, English, French, and Russian. A qualified list of patents in the electrical fishing field is also provided.

--W. H. Stoltzing

FISH:

Fishes of the World in Color, by Hans Hvass, illustrated by Wilhelm Eigener, translated by Gwynne Vevers, 156 pp., printed, 1965, \$4.95. E. P. Dutton and Co., Inc., 201 Park Ave. South, New York, N. Y. 10003. Some 1,000 species of fish from all over the world are to be found in this book. Those selected are principally commercial fish and those caught by anglers. But, in addition, as many species as possible of aquarium fish have been included. Each species is illustrated with a special colored sketch, accompanied by text giving some pertinent facts and its geographical distribution. The fish are divided into ray-finned fish (bony fish, bony ganoids, sturgeon, etc.); coelacanth; lungfish; cartilaginous fish (rabbitfish, rays and skates, shark and dogfish), and cyclostomes (lamprey and hagfish). The English name of each fish shown in the book is printed in bold type, followed by the scientific or Latin name printed in italics. An index of the common names is included. Anyone interested in fisheries will find this book interesting and useful.

--Joseph Pileggi

FISHING GROUNDS:

"Las pesquerías del Indico Austro-Africano" (The fishing grounds of India-South Africa), article, Industrias Pesqueras, vol. 39, no. 919, August 1965, pp. 362-363, illus., printed in Spanish, single copy 50 ptas. (about US\$0.85). Industrias Pesqueras, Apartado 35, Policarpo Sanz, 21-2, Vigo, Spain.

FISH MEAL:

"El 'boom' Peruano de la 'fish meal.' II. La fluctuación económica y el futuro" (The 'boom' from the Peruvian 'fish meal.' II. Economic fluctuation of the future), article, Industrias Pesqueras, vol. XXXIX, no. 916, June 1965, pp. 284-285, illus., printed in Spanish, single copy 50 ptas. (about US\$0.85). Indus-

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trias Pesqueras, Apartado 35, Policarpo Sanz, 21-2, Vigo, Spain.

FOOD AND AGRICULTURE ORGANIZATION:

Indo-Pacific Fisheries Council Proceedings, 11th Session, Kuala Lumpur, Malaysia, 16-31 October 1964, Section I, 97 pp., processed in English, 1965, US\$1. IPFC Secretariat, FAO Regional Office for Asia and the Far East, Bangkok, Thailand, 1965. (Sold by Publications Section, FAO, via delle Caracalla, Rome, Italy.) The full proceedings of this session of the Council consists of three sections. This is a report of Section I. Section II comprises the Technical Papers presented at the meeting and Section III contains the papers read at the symposium.

FRANCE:

"How France Trains Its Crews--Nine-Month Course at Boulogne School," article, World Fishing, Nov. 1965, pp. 39-40, illus., printed in English, 3s. 6d. (about US\$0.55). Grampian Press Ltd., The Tower, 229-243 Shepherds Bush Rd., Hammersmith, London W6, England. Describes the subject matter and educational theory of apprentice training for fishermen at the secondary school level in France.

INDIA:

Development of Fisheries in the Cochin Area, An Export Oriented Project Report, 110 pp., printed in English, January 1965. Marine Products Export Promotional Council, Ernakulam, Kerala State, India. Describes how India's fishery export trade came to be centered in the Cochin area of southeast India. Surveys that area's fishery resources, fleet, processing and support facilities, and export markets. Makes recommendations for further development by carrying out oceanographic and fishery research surveys; improving the fishing fleet, harbors, processing equipment, transport facilities; providing training; and conducting more intensive marketing. The report was prepared at the request of an Inter-Ministerial Group in the Indian Government which met November 7, 1964, in New Delhi to consider ways of increasing India's fishery exports. Similar export-oriented reports were planned for other areas including Goa and Ratnagiri.

INDUSTRIAL PRODUCTS:

Fishery By-Products Technology, by Julius Brody, 245 pp., illus., printed, 1965, \$12.50 U.S., \$13.50 foreign. The Avi Publishing Co., Inc., P.O. Box 388, Westport, Conn. This is a comprehensive summary of the manufacture of practically all fishery byproducts and of the industrial application of those products. The foreword points out: "If meaningful advances are to be made in the utilization of the oceans for the feeding of man, if lowest costs of edible fishery products are to be achieved, attention must be paid to by-product utilization. Optimal utilization of by-products will not only result in better utilization of our resources but also in lower-cost foods." Emphasis is placed on the lesser known products in order to show their valuable potential to fishery processors and allied manufacturers. Recent developments in processing and use of the better known byproducts are considered in detail. Descriptions of inexpensive manufacturing procedures designed for the benefit of developing seacoast countries are given. The book is divided into three major parts: Part I describes the byproducts obtained

from the outer portion of fish, i.e., skins and scales; Part II discusses derivatives from entrails; and Part III deals with byproducts obtained from fish scrap remaining after gutting and filleting, or by using the whole fish, e.g., trash fish or industrial fish. The individual chapters deal with liquid fish glue; gelatin and isinglass production; pearl essence; leather production from fish skins; fish-liver oils; non-fat components of fish oils; production of vitamin concentrates; salmon egg byproducts and other salmon canner waste; insulin, biochemical and pharmaceutical products of special interest; fish meal production; general considerations of fish oils; fish-body oil; refining and utilization of fish oils; production of fish albumin, peptones, and amino acids; animal feed; plant food; and last but not least, fish protein concentrate (fish flour). Each chapter ends with a bibliography, and there is an adequate overall index. Food technologists, food scientists, nutritionists, research chemists, fishery plant operators, biochemists, plant food and animal feed manufacturers, students, economists, dealers, and others will find this book a useful tool for study and reference.

--Joseph Pileggi

JAPAN:

Bulletin of the Faculty of Fisheries, Nagasaki University, no. 19, 195 pp., illus., printed in Japanese with English summaries, October 1965. The Faculty of Fisheries, Nagasaki University, Nagasaki, Japan. Some of the articles are: "On the Porpoises Caught by the Salmon Fishing Gill Net in Bering Sea and the North Pacific Ocean," by K. Mizue and K. Yoshida; "Analysis of Fish-Finder Record - VI. On the fish-finder for biomeasurement," by K. Shibata; "On the Tuna Long-Line Fishing Ground in Summer in the Southern Waters of Sumatra," by S. Abe, S. Yada, T. Takada, and S. Inoue; "The Feeding of Rainbow Trout Fry with Natural Foods and the Maximal Growth in their Younger Stages," by S. Shirahata.

LOBSTER:

"The American lobster," by D. G. Wilder, article, Trade News, vol. 18, no. 4, Oct. 1965, pp. 6-11, illus., printed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Describes the American lobster (*Homarus americanus*); distribution, feeding, and movements; molting, growth, and age; maturity, mating, and egg laying; disease and parasites; fishing gear and landings; fishing seasons; minimum size limits; protection of egg-bearing females; offshore fishery; and storage and marketing.

"En el paraíso de la langosta" (In the lobster paradise), by Pedro Morales, article, Mar & Pesca, vol. 1, October 1965, pp. 34-38, illus., printed in Spanish, annual subscription \$3.50. Mar & Pesca, Amargura y San Ignacio, Havana, Cuba.

"Notes on trends in the abundance of the west coast rock lobster," by A. E. F. Heydorn, G. C. Newman, and G. S. Rossouw, article, The South African Shipping News and Fishing Industry Review, vol. XX, no. 10, October 1965, pp. 91, 93, 95, 97, 99, 103, illus., printed, single copy 30¢ (about US\$0.45). Thomson Newspapers, South Africa (Pty.) Ltd., Trust House, Thibault Sq., Box 80, Cape Town, South Africa Republic.

MARINE BIOLOGY:

"On the biology of the commoner gadoids in Manx waters," by A. K. Nagabhushanam, article, Journal of

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the Marine Biological Association of the United Kingdom, vol. 45, no. 3, pp. 615-657, illus., printed, October 1965, \$13.50. Cambridge University Press, 32 East 57th St., New York, N. Y. 10022.

NORWAY:

Fiskeristatistikk 1963 (Fishery Statistics 1963), Norges Offisielle Statistikk XII 179, 83 pp., illus., printed in Norwegian with English table of contents, 1965. Fiskeridirektøren (Director of Fisheries of Norway), Bergen, Norway. Contains statistical summaries on the quantity and value of the yield in principal Norwegian sea fisheries; quantity and value of each species; disposition of landings; production of processed fishery products; and foreign trade. Also contains data on prices, subsidies, income, investments, and loans in the Norwegian fishing industry; data on Norwegian fishermen and fishing vessels; and related facts and figures.

Articles from Tidsskrift for Hermetikindustri (Norwegian Cannery Export Journal), vol. 51, illus., printed in Norwegian, foreign annual subscription kr. 20.00 (US\$2.80), Norske Hermetikfabrikers Landsforening, Stavanger, Norway:

"Industriell trålfiske dobbeltfrysing av fisk norsk filetindustri" (Industrial trawl fishery, double freezing of fish, and Norwegian fillet industry), by Gustav Lorentzen, no. 11, Nov. 1965, pp. 442-451.

"Industriell optøning af fisk" (Industrial thawing of fish), no. 10, Oct. 1965, pp. 385-393, and 410.

OCEANOGRAPHY:

"Helztu nidurstodur fundar norskra, sovezkra og islenzkra haf og fiskifraedinga, haldinn a Seydisfirði 20-22 júní 1965" (Major conclusions of the meeting of oceanography fishery specialists from Norway, Russia, and Iceland held at Seydisfirði on June 20-22, 1965), article, Aegir, vol. 58, no. 15, pp. 248-249, illus., printed in Icelandic, Sept. 1, 1965. Aegir, Rit Fiskifelags Islands, Reykjavík, Iceland.

Pendulum Gravity Measurements at Sea, 1936-1959, Lamont Geological Observatory Contribution No. 807, by J. L. Worzel, xx + 420 pp., illus., printed, October 1965, \$28. John Wiley & Sons, Inc., Publishers, 605 Third Ave., New York, N. Y. 10016. Records for the first time 3,000 new gravity measurements made with pendulums in submarines--two-thirds of all the measurements ever made. It serves as a framework upon which surface-ship observations can build, and represents a first view of the structure of what has been called the normal part of our planet--the ocean. The observations are arranged so that they can be found either by cruise or by geographical area. Base stations are detailed in a special section. Another feature is the presentation of all the gravity observations taken to date superimposed on the oceanic topography (both as free-air and as Bouguer anomalies) on charts suitable for mounting as a composite world chart. Interpretations of these data are given from both a geodetic and structural view of the world. Special attention is given to the physics of the measurement techniques. Apparatus modifications and improvements are detailed, and the resulting geodetic, geophysical, and geological implications are discussed at length.

PERU:

"The Anchovy Crisis," article, The Economist, vol. CCXVII, no. 6383, December 25-31, 1965, pp. 1,429-1,430, illus., printed in English, annual subscription £6 10s. (about US\$18.20). The Economist, 25 St. James Street, London SW1, England. Describes the oceanic conditions and economic impact of the recent decline of the Peruvian anchovy resource.

POLAND:

Articles from Prace Morskiego Instytutu Rybackiego w Gdyni (Reports of the Marine Fisheries Institute at Gdynia), vol. 13, series A (1965), Oceanography and Fishery Biology, printed in Polish with English summaries. Wydawnictwo Morskie, Gdynia, Poland:

"Biological characteristic of cod (Gadus morrhua callarias L.) from Bornholm Basin during 1957-1960," by E. Stanek, pp. 57-84.

"Eel (Anguilla anguilla L.) of the Wista Estuary," by J. Filuk, pp. 101-114.

"Age and rate of growth of perch (Perca fluviatilis L.) from the Wista Estuary," by H. Krawczak, pp. 115-130.

POLLUTION:

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for surveying the sea bed is described. The illustrations show that good quality results can be obtained when the camera is towed at speeds of around 5 knots. By keeping the camera within a fathom from the bottom, satisfactory photographs can be obtained even where turbidity prevents photography at greater ranges.

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A FISH CAN BE A LANDLUBBER

Some fish like being out of the water. The mudskipper, a small marine fish, seems right at home onland. They can stay out of water at least 90 percent of the time with only brief returns to the sea to sip some water, reports a zoologist at the Los Angeles University of California. They usually just immerse their mouths, he observed, unless they are disturbed and dive completely in the water.

Mudskippers could survive out of water for as long as a day and a half, stated the zoologist, who has been studying those fish on the island of Nosy Be, just off the coast of Madagascar. Even during the heat of the day the fish usually moistened their general body surface less than once an hour.

This ability to adapt to land gives the mudskippers more opportunities to survive, the zoologist believes. By being able to pursue insects on land, the fish are less dependent on marine organisms for food. Possibly the phenomenon of the mudskipper tells the story of how our ancestors originally emerged from the sea.

Most fish cannot survive out of water. When they do, drastic physiological changes occur, similar to those when human beings dive into water. Heart and metabolic rates slow down dramatically, and lactic acid piles up in tissues. However, none of these things happens to mudskippers when they stay on land, out of water. (Science News Letter, December 12, 1964.)



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* * * * *

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TRIO OF SEAFOOD TREASURES FROM A SEA CAPTAIN'S WIFE

Shortly after sunup on a bright New England morning in early spring of 1867, a mythical ship took a mythical trip with a mythical crew aboard. On this voyage, Lucy, the Captain's wife, an avid recipe collector, wrote a series of letters to her cousin, Sarah, who remained in New Bedford. From these letters, the United States Department of the Interior's Bureau of Commercial Fisheries has captured all the romance and glamour of this century-old trip to the whaling grounds in announcing a new collection of kitchen-tested recipes for today's busy homemaker.

Are your menus winter weary? The trio of seafood treasures, fresh from the sparkling waters of the Gulf, is certain to bring the spring to your dining room.



Key West Shrimp Salad stars America's favorite seafood. The shrimp are combined with an assortment of crisp vegetables and a taste-tingling marinade, then chilled just long enough for the flavors to mingle. This imaginative salad will win showers of praise for the busy hostess.

KEY WEST SHRIMP SALAD

1 lb. cooked, peeled, cleaned shrimp, fresh or frozen	$\frac{1}{4}$ cup chopped onion
or	$\frac{1}{4}$ cup chopped green pepper
4 cans ($4\frac{1}{2}$ ozs. each) shrimp	1 tablespoon chopped pimiento
1 can (1 lb.) cut green beans, drained	Marinade
1 cup sliced raw cauliflower	Lettuce
1 cup sliced celery	

Thaw frozen shrimp or drain canned shrimp. Rinse canned shrimp with cold water. Cut large shrimp in half. Combine all ingredients except lettuce. Cover and let stand in refrigerator for at least 1 hour. Drain. Serve on lettuce. Serves 6.

Marinade

$\frac{1}{2}$ cup vinegar	$\frac{1}{4}$ teaspoon salt
1 tablespoon sugar	Dash pepper
$\frac{1}{2}$ teaspoon celery seed	$\frac{1}{4}$ cup olive or salad oil

Combine vinegar, sugar, and seasonings. Add oil gradually, blend thoroughly. Makes $\frac{3}{4}$ cup marinade.



Voyage of the whaler Lucy S.

Florida Snapper Delight presents the colorful deep-water specialty of the South. The succulent snapper fillets are basted with fresh orange juice; highlighted with soy sauce; then broiled to a tender, juicy perfection.

FLORIDA SNAPPER DELIGHT

2 lbs. snapper fillets or other fish fillets, fresh or frozen	1 tablespoon soy sauce
$\frac{1}{4}$ cup frozen orange juice concentrate	1 teaspoon salt
$\frac{1}{4}$ cup butter or margarine, melted	Dash pepper

Thaw frozen fillets. Cut into serving-size portions. Combine remaining ingredients and mix thoroughly. Place fish, skin side up, on a well-greased broiler pan and brush with sauce. Broil about 3 inches from source of heat for 4 to 5 minutes. Turn carefully and brush with sauce. Broil 4 to 5 minutes longer, basting occasionally, until fish flakes easily when tested with a fork. Serves 6.

A new flavor note is added to the delicate goodness of crab meat in this unusual recipe, Crab Pineapple Imperial.

CRAB PINEAPPLE IMPERIAL

1 lb. king crab meat or other crab meat, fresh or frozen	$\frac{1}{2}$ teaspoon Worcestershire sauce
or	3 drops liquid hot pepper sauce
3 cans ($6\frac{1}{2}$ or $7\frac{1}{2}$ ozs. each) crab meat	6 large pineapple slices, drained
$\frac{1}{4}$ cup mayonnaise or salad dressing	$\frac{2}{3}$ cup fine corn flake crumbs
1 teaspoon chopped pimiento	1 tablespoon melted fat or oil
$\frac{1}{2}$ teaspoon salt	$\frac{1}{4}$ cup fine corn flake crumbs

Thaw frozen crab meat. Drain crab meat. Remove any remaining shell or cartilage from crab meat. Flake the crab meat. Combine mayonnaise, pimiento, and seasonings. Add to crab meat and mix lightly. Dip both sides of pineapple slices in crumbs. Place in a well-greased baking dish, $12 \times 7\frac{1}{2} \times 2$ inches. Place $\frac{1}{4}$ cup crab mixture on top of each pineapple slice. Combine fat and crumbs; sprinkle over top of crab mixture. Bake in moderate oven, 350° F., for 20 to 25 minutes or until crumbs are lightly browned. Serves 6.

MOBILE FISH INSPECTION LABORATORY AT GLOUCESTER



The chief lot inspector at the Gloucester laboratory examines Bureau's first mobile inspection laboratory.

A specially equipped camper shuttles between the U. S. Bureau of Commercial Fisheries Technological Laboratory at Gloucester, Mass., and processing plants within a radius of 75 miles. The truck carries complete fishery products inspection facilities. This mobile laboratory, which made its first run in January 1966, can provide more efficient inspection services at reduced costs to the industry. It also eliminates the problems connected with transporting frozen samples.

The unit is equipped with a deep sink, hot and cold running water, air compressor, deep fat fryer, gas range, freezer, and space heater. All of the equipment, with the exception of the freezer, are operated by bottled gas. The freezer is operated through a 110-volt converter generator.

ROBERT H GIBBS JR

COMMERCIAL FISHERIES REVIEW

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Fishes



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APRIL 1966

UNITED STATES DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington, D.C.



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
G. A. Albano and H. Beasley, Assistant Editors

Address correspondence and requests to the: Chief, Fishery Market News Service, U.S. Bureau of Commercial Fisheries, 1815 North Fort Myer Drive, Room 510, Arlington, Va. 22209.

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5/31/68

CONTENTS

COVER: Trawl catch being culled on the sorting table of the M/V
Yaquina. (See p. 1 of this issue.)

Page	
1	Alaska Shrimp Explorations, 1962-64, by Warren F. Rathjen and Mitsuo Yesaki
15	Gear and Technique of the Sea Bass Trap Fishery in the Carolinas, by J. B. Rivers

Page	
	TRENDS AND DEVELOPMENTS:
	Alaska:
21	King Crab Workshop Scheduled
21	U. S. Bering Sea King Crab Catch Increases
	California:
21	Abalone Observations and Growth Studies Continued
22	Notes on Marine Resources for 1965
22	Marine Sport Fish Survey off Southern California
	Central Pacific Fisheries Investigations:
22	Tuna Biological Studies Continued
	Federal Purchases of Fishery Products:
23	Department of Defense Purchases, January-December 1965
	Fish Sticks and Portions:
24	U. S. Production, Oct.-Dec. 1965
	Florida:
25	EDA Grant to Provide New Water Lines to Fishery Plants

Page	
	TRENDS AND DEVELOPMENTS (Contd.):
	Great Lakes:
25	Michigan Conservation Commission Proposes New Regulation on Yellow Perch and Northern Pike Fishing
	Great Lakes Fishery Investigations:
25	Sea Lamprey Control Research, December 1965
	Great Lakes Fisheries Explorations and Gear Development:
26	Lake Michigan Trawling Studies
	Industrial Fishery Products:
	U. S. Fish Meal and Solubles:
27	Production and Imports, 1964-1965
	U. S. Fish Meal, Oil, and Solubles:
27	Production by Areas, January 1966
27	Production, December 1965
	Maine Sardines:
28	Canned Stocks, January 1, 1966
	North Atlantic Fisheries Investigations:
29	Distribution of Zooplankton Studied

Contents continued page II.

CONTENTS (CONTINUED)

Page		Page	
	TRENDS AND DEVELOPMENTS (Contd.):		FOREIGN (Contd.):
	North Pacific Fisheries Explorations and Gear Development:		International (Contd.):
29 ..	Hake and Anchovy Population Survey Continued		International Pacific Salmon Fisheries Commission:
	Oceanography:	51 ..	Regulations for 1966 Sockeye and Pink Salmon Fishery in North Pacific
31 ..	Antarctic Ocean Biological Study		Law of the Sea:
32 ..	Marine Scientist Studies Antarctic Ocean Squid and Octopod	53 ..	Convention on Fishing and Conservation of the Living Resources of the High Seas Ratified by Mexico
32 ..	University of Miami's Research Vessel <u>John Elliott Pillsbury</u> Begins 9-Week Survey		Northwest Pacific Fisheries Commission:
33 ..	Study Sheds New Light on Gulf Stream	53 ..	Meeting, Feb. 25-Mar. 25, 1966
	Oregon:		Argentina:
34 ..	Changes in Fishery Regulations Considered	53 ..	Government Requests Japanese Help in Making Fishery Marketing Survey
34 ..	Willamette Falls Fishway Construction Contract Awarded	53 ..	Japanese-Argentine Joint Firm Plans to Process Agar-Agar
	Oysters:		Barbados:
35 ..	EDA Approves Project to Study Seeded Beds in Chesapeake Bay	54 ..	Status of Tuna Fishery, 1965
	Rhode Island:		Canada:
35 ..	Fishermen's Forum Held	54 ..	New Herring Reduction Plant for East Coast
	Salmon:	54 ..	Federal-Provincial Development Program for Newfoundland and Labrador
36 ..	U. S. Pacific Coast Canned Stocks, January 1, 1966	55 ..	British Columbia Landings, 1965
	Shellfish:	56 ..	New Licensing System for British Columbia Fishermen and Vessels
37 ..	National Conference on Depuration		Chile:
	Shrimp:	56 ..	Fish Meal Industry, 1965 and Future Prospects
37 ..	More Shrimp Eaten by Americans		Cuba:
38 ..	Breaded Production, October-December 1965	57 ..	Havana Fishing Port to Open Soon
	South Atlantic Fisheries Explorations and Gear Development:	57 ..	Cuban Fishing Vessel Under Soviet Master
38 ..	Abundance and Distribution of Brown and Pink Shrimp off Florida Coast Studied		Denmark:
	Tropical Atlantic Fisheries Investigations:	57 ..	Fish Meal, Oil, and Solubles Production, 1964-1965; Export Trends, December 1965
38 ..	Live Bait Distribution and Tuna Studies	57 ..	Minimum Pond Trout Prices Asked
	United States Fisheries:	58 ..	Eel Studies in the Sargasso Sea
41 ..	Ex-Vessel Value of Catch Sets Record in 1965		El Salvador:
	U. S. Fishing Vessels:	58 ..	Foreign Fishing Vessels Permitted to Enter El Salvador Ports
42 ..	Documentations Issued and Cancelled, October 1965		Faroe Islands:
	U. S. Foreign Trade:	58 ..	Landings and Exports at Record Level in 1965
42 ..	Imports of Canned Tuna in Brine Under Quota		India:
	Virginia:	58 ..	Standards for Shrimp Exports
42 ..	Industrial Fish Investigations Commenced		Israel:
	Washington:	59 ..	Tuna Fishing Activity in the Atlantic
43 ..	Wind River Chinook Salmon Fishway Improved		Japan:
	Wholesale Prices:	59 ..	Frozen Tuna Market Price High in January 1966
44 ..	Edible Fish and Shellfish, February 1966	60 ..	Canned Tuna in Brine Export Market, January-February 1966
	FOREIGN:	60 ..	Exporters' Views on Packers' Proposal to Change Canned Tuna Export Policy
	International:	61 ..	Tuna Landings in Yaizu, Japan, January 1966 and Year 1965
46 ..	Foreign Fishing off U. S. Coasts:	61 ..	Tuna Mothership-Type Purse-Seine Test Fishing off West Africa
	Soviet and Japanese Activity, February 1966	61 ..	Government-Industry Report on Assessment of Tuna Resources
	European Fishery Exhibitions:	63 ..	Exports of Frozen Rainbow Trout, November 1965
47 ..	Recent and Future Fishery Trade Fairs	63 ..	Exports of Marine Products, September 1965
48 ..	Food and Agriculture Organization:	63 ..	Exploratory Trawl Fishing in Southern Latitudes
49 ..	South America Exports More Fish in 1964	64 ..	Fisheries Agency Budget for FY 1966
49 ..	World Fishery Trade in 1964 Establishes Record		
50 ..	Food Irradiation Symposium Called		
	International Pacific Halibut Commission:		
50 ..	North Pacific Halibut Regulations for 1966		

Contents continued page III.

CONTENTS (CONTINUED)

Page		Page	
	FOREIGN (Contd.):		FOREIGN (Contd.):
	Japan (Contd.):		U.S.S.R.:
64 ..	Construction of Underwater Research Vessel Planned	72 ..	Fishery Landing Trends in 1964-1965, and Outlook for 1966-1970
64 ..	Ratification of Two Geneva Conventions Expected	73 ..	Indian Ocean Fishery Trends
	Korea:	73 ..	Fishing Fleet Expansion Planned for 1966-1970
65 ..	Shipbuilding Mission from Japan Visits Korea	73 ..	New Japanese-Built Factoryship for Soviet Pacific Fleet
	Mexico:	73 ..	Fisheries Aided by Growing Fleet of Transport Vessels
65 ..	Shrimp Exports, 1965	73 ..	Freezer-Trawler <u>Pavlovo</u> Delivered to Soviets by Danish Shipyards
	Morocco:	74 ..	North Atlantic Studies of Ocean Perch
65 ..	Atlantic Tuna Fisheries	74 ..	Pollock Fishery in Western Pacific
	Norway:	74 ..	Oceanographic Research in the Southern Pacific
66 ..	Herring Factoryship to Operate in 1966		United Arab Republic:
	Peru:	74 ..	Fishing Fleet Expansion with Soviet Aid Planned
66 ..	Peruvian Fish Meal Industry Trends in 1965, and Future Prospects for 1966		United Kingdom:
66 ..	Fish Oil Exports, January-September 1964-1965	74 ..	International Food Fair at Manchester
67 ..	Fishing Licenses for Foreign Flag Vessels		Venezuela:
	Poland:	75 ..	Tuna Fisheries, 1965
67 ..	Recent Fishery Developments		FEDERAL ACTIONS:
68 ..	Polish Fisheries Attache in Ghana		Department of Commerce:
	Portugal:		Economic Development Administration:
68 ..	Canned Fish Exports, January-September 1965	76 ..	Federal Funds to Aid Rehabilitation of Lake Superior Fishing Industry
68 ..	Canned Fish Pack, January-September 1965	76 ..	Study Grant May Lead to Fish Meal Industry in Tennessee
	Rumania:		Department of the Interior:
68 ..	Landings and Fishery Trends, 1965		Fish and Wildlife Service:
	Senegal:		Bureau of Commercial Fisheries:
69 ..	Fisheries Development Project	77 ..	Applications for Fishing Vessel Loans
	Sierra Leone:	77 ..	Hearing on Application for Fishing Vessel Construction Differential Subsidy
69 ..	Atlantic Tuna Fisheries	77 ..	Revised U. S. Standards for Frozen Raw Breaded Shrimp--Requirements for Condition of Coating Still Being Evaluated
	South Africa Republic:	78 ..	Udall Congratulates Bureau on Its 95th Anniversary
69 ..	Atlantic Tuna Fisheries Situation		Department of the Treasury:
	South-West Africa:		Bureau of Customs:
70 ..	Pilchard Season Started January 31, 1966	78 ..	Groundfish Fillet Import Tariff-Rate Quota for 1966
	Spain:	79 ..	Eighty-Ninth Congress (Second Session)
70 ..	Freezer-Trawler Fleet Growing Rapidly		RECENT FISHERY PUBLICATIONS:
	Taiwan:	83 ..	Fish and Wildlife Service Publications
71 ..	Landings in 1965	84 ..	Miscellaneous Publications
71 ..	Tuna Fishing off South Africa		
	Trinidad and Tobago:		
71 ..	Tuna Fisheries, 1965		
	Tunisia:		
72 ..	Mediterranean Tuna Fisheries		



AMBERGRIS PRIZED BUT HARD TO SELL

Ambergris is a wax-like substance from sperm whales, once highly valued as an odor fixative in perfume.

In earlier days ambergris was worth its weight in gold, but the introduction of synthetic substances caused prices to tumble. Even so the world market price is still believed to be about £40 (US\$112) a pound, but the demand is not great and is restricted to a few high-quality perfume manufacturers.

Of hundreds of samples submitted for testing only one or two prove to be real ambergris.

All this stems from the most common origin of ambergris, flotsam and jetsam on the beach where it may be found by anyone. Interest in the search is sustained by an occasional find of ambergris, either in a large chunk or in a multitude of small particles. True ambergris may also be found floating on the surface of the open ocean or lodged in the lower intestines of a dead sperm whale where it originated.

Ambergris may be soft and waxy to touch or rather hard and friable, depending on its age and dryness. It usually can be kneaded in the fingers, and has the consistency of pitch, but is not sticky. In color it is black, grey-white, mottled grey, and black, or brown and yellow, or any combination. It sometimes has an internal structure of concentric layers like an onion, and often has fragments of squid beaks or squid "bone." Its odor is fetid when fresh and dark-colored and musky in a sweet, earthy way when older, drier, and lighter in color.

Tests for ambergris are: melting point, burning properties, fluorescent properties of alcohol solution, hot wire test, and microscopic examination which should reveal fragments of the chitinous beak of squid, and perhaps fragments of the calcareous "pen bone" or internal skeleton of certain species.

One of the biggest pieces of ambergris found in recent years weighed 918 pounds. It was removed from a sperm whale aboard the British whaling ship, Southern Harvester, in 1953.

When the Russian Antarctic whaling fleet called at Melbourne in 1964, several hundred pounds of ambergris was reported to be among whale products aboard the factory ships, including one piece weighing 180 kilos (about 397 pounds). It was stated that the price paid in Russia for ambergris was £A400 a kilo (US\$407 a pound).

The West came to know of ambergris through an Arabian merchant who ventured forth to the islands of the Indian Ocean. On the Andaman Islands he traded iron against ambergris, a product that Orientals had long prized as an aphrodisiac. By the Middle Ages, Europeans, too, had begun to use it in love philtres and also as a cure for dropsy and other diseases. As the demand rose while the supply (whose source remained a mystery) lagged behind, prices rose to giddy heights.

Marco Polo, who knew that Oriental sailors hunted sperm whales for their ambergris, thought that these animals simply swallowed this substance with the rest of their food. It was not until 1724 that Dudley showed that ambergris is formed inside the sperm whale, and as late as 1791 the House of Commons in England was so puzzled by this mysterious substance that they summoned Capt. Coffin, the master of a whaler, to explain exactly what ambergris was.

It formerly was believed that ambergris was the result of disease or malnutrition but Robert Clark, who was present when the enormous piece of ambergris was found in the sperm whale caught by the Southern Harvester, reported that the animal was extremely healthy and well fed.

Actually, ambergris may well be comparable to the intestinal stones of otherwise healthy terrestrial mammals. Cows, for instance, often have stones or big hair balls in their intestines, and the well-known Dutch expert on stranded whales, Dr. A. B. van Deinsen, examining a stranded porpoise in 1935, discovered no less than 20 glittering white stones in its intestine, the largest of which measured 1 inch x 4/5 inch x 3/5 inch. The stones consisted of calcium phosphate and many organic compounds.

Ambergris may, therefore, be the pathological product of an otherwise normal intestine, its basis being intestinal matter. In fact, a product resembling ambergris has been made experimentally from the feces of a sperm whale. (Australian Fisheries Newsletter, August 1964.)

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ALASKA SHRIMP EXPLORATIONS, 1962-64

By Warren F. Rathjen* and Mitsuo Yesaki**

ABSTRACT

Recognizing the need for more detailed knowledge of potential Alaska shrimp resources, the U. S. Bureau of Commercial Fisheries conducted intensive exploratory fishing with shrimp trawls during the summers of 1962, 1963, and 1964. Waters explored during the 3 years included those of the northern Gulf of Alaska between Cape Suckling (lat. 60° N., long. 144° W.) and Unalaska Island (lat. 54° N., long. 167° W.). Some preliminary explorations were made in portions of the Bering Sea. During the studies, 539 trawl drags (ranging from 30 to 60 minutes each) captured over 100,000 pounds of shrimp. Pink shrimp (*Pandalus borealis*) made up 72 percent of the total catch, and averaged 90 shrimp per pound. A larger species, side-stripe shrimp (*Pandalopsis dispar*), made up 18 percent of the catch. Smaller amounts of other species were taken.

The highest average catch rates were made in the general vicinity of the Shumagin Islands where 82 trawl drags of about 30 minutes averaged over 650 pounds per drag.

Observations were made on the occurrence of other species including king, Dungeness, and tanner crabs. During 1963 and 1964, 56 percent of the fish species caught incidentally included various types of flatfish; pollock, rockfish, and other species were important in the remainder.

INTRODUCTION

During recent years, shellfish (including shrimp, crab, lobsters, etc.) have been consumed in increasing quantities in the United States. For example, the total production of U. S.-caught shrimp during 1950 was 191 million pounds. In addition, 40 million pounds of shrimp were imported into the United States for a total supply of 231 million pounds. In 1963, U. S. vessels produced 240 million pounds of shrimp, and an additional 152 million pounds were imported into the United States for a total supply of 392 million pounds (Power 1964). The demand for shrimp has greatly exceeded the domestic supply in recent years. A ready, potential market for shrimp products exists in the United States.

The demand for shrimp products is reflected in the increased landings of Alaska shrimp recently. During the 13-year period 1950-63, the landings increased sevenfold from 2.1 to 15.1 million pounds. Prior to 1958, Alaska shrimp production varied between 1 to 2 million pounds per year. From 1958 to 1963, when the fishery had its greatest growth, shrimp production averaged 12.7 million pounds (Harry 1964). This level of production, however, is probably far below the maximum production because the fishery is now still quite localized.

A primary factor in the greater use of Alaska shrimp has been the development and application of new techniques in processing. Prior to 1957, all Alaska shrimp were peeled by hand and marketed as fresh or frozen shrimp meat. Although hand-peeled shrimp meat continues to be produced, most of the shrimp landed during 1963 were processed by machines. Machine-peeled shrimp meat were marketed canned or frozen in shrimp "logs." Those products, however, did not have the good market demand of hand-picked shrimp products. Further growth of the Alaska shrimp industry would be greatly aided by technological advances in volume storage and in peeling processes to minimize changes in color, flavor, and texture of the product.

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The purpose of this paper is to present a general summary of the relative abundance of pandalid shrimp in the areas of explorations.

PREVIOUS EXPLORATIONS

During 1950-59, Bureau of Commercial Fisheries vessels made 10 exploratory shrimp cruises in Alaska waters. Of the 10 cruises, 4 were made off Southeastern Alaska, 5 off Central Alaska, and 1 off the Alaska Peninsula. The primary aim of the shrimp explorations was to determine the distribution and availability of shrimp in those areas. Large concentrations of shrimp were located in numerous areas around the Kenai Peninsula and Kodiak Island in waters off Central Alaska and around the Shumagin Islands in waters off the Alaska Peninsula. The results of the shrimp exploratory cruises have been incorporated into a summary report by Ronholt (1963). Supplementary information regarding commercial concentrations of shrimp is also available from explorations in Alaska waters by Russian (Ivanov 1962) and Canadian¹ nationals. Russian explorations delineated concentrations of shrimp around the Shumagin Islands and Kodiak Island. Canadian explorations located large concentrations of shrimp off Kodiak Island.

1962-64 EXPLORATIONS

The investigations were carried out in three stages during the summers of 1962, 1963, and 1964. In 1962, the 6-week period from August 21 to October 4 was spent in exploring the waters off Central Alaska from Nuka Island eastward to Cape St. Elias. During the 9-week period from July 8 to September 11, 1963, the waters off Central Alaska were explored from Montague Island westward to Chirikof Island. During the 1964 cruise, the waters of Central Alaska, Alaska Peninsula, and the Bering Sea were explored from Kodiak Island to Unalaksa Island to Bristol Bay. This cruise extended for a 13-week period from June 16 to September 19. The three cruises were planned to provide more detailed information on the species, size, and abundance of shrimp in the northwestern Gulf of Alaska and Bering Sea. The Bureau of Commercial Fisheries had not previously explored the Bering Sea for shrimp.

Most explorations during the three cruises were made in areas where future development of the fishery appeared logical. Certain phases of the explorations, however, were at locations where no immediate fishery development is anticipated because of a combination of circumstances, particularly the distance from processing centers.

VESSELS

Charter vessels were used. The M/V Yaquina made the 1962 and 1963 cruises; and the M/V Paragon, the 1964 cruise.

The Yaquina (fig. 1) is a typical Pacific Northwest multipurpose purse-seine type vessel with house forward and work deck aft. The registered length is 75.1 feet, and gross tonnage is 109 tons. A 460-hp. diesel engine provides propulsion and drives generators and hydraulic pumps. The vessel is equipped with hydraulic trawl winches and a hydraulic net reel which is used to retrieve and store the trawl net. In most instances the reel was used to haul the shrimp trawl over the stern.

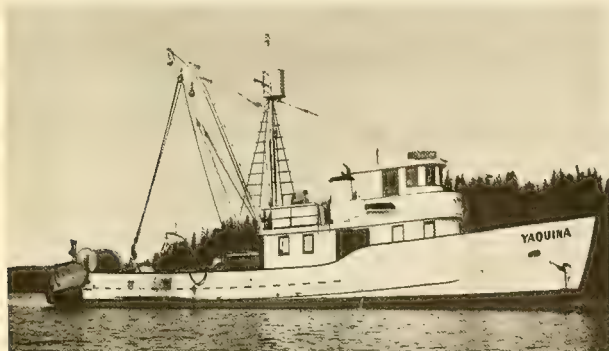


Fig. 1 - M/V Yaquina, chartered by the U.S. Bureau of Commercial Fisheries during summers of 1962 and 1963.

¹/Cruise Report for the C. B. Reed, Cruise #7, August 20-September 22, 1963. Fisheries Research Board of Canada, Biological Station, Nanaimo, British Columbia, Canada.

The Paragon (fig. 2) is a Pacific halibut schooner with house aft and well deck amidships. It has a registered length of 80.1 feet and a gross tonnage of 99 tons. Propulsion and trawl winch power are provided by a 390-hp. diesel engine. The trawl winches are mechanically driven. Since the work area on this vessel is amidships, the trawl bag was

taken aboard with boom and tackle after being brought forward on the starboard side to the well deck by means of a lazy-line.

The vessels Yaquina and Paragon were equipped with a full complement of navigational and fishing aids including loran, radar, radiotelephone, automatic pilot, and depth-recorder. The depth-recorders were of the "white-line" type with a range of over 500 fathoms.

GEAR

During the cruises, three types of shrimp trawls were used. In 1962, all but two of the trawl drags were made with a semiballoon shrimp trawl measuring 70 feet along the foot-rope (Greenwood 1959). In 1963, the 40-foot flat shrimp trawl was the primary sampling gear, while in 1964, both the 40-foot flat and the 40-foot semiballoon trawls were used (Fuss 1963). All three types of nets were made of $1\frac{1}{2}$ -inch stretched mesh nylon webbing.

The footropes of the trawls were appropriately weighted with chain and/or wire rope so that the nets would fish more effectively on the bottom. The 70-foot semiballoon trawl, which had two warps and 7-foot trawl doors, was towed in the same manner as in other trawling. The 40-foot trawls were towed by a single warp with 25-fathom bridles and 5-foot trawl doors.

METHODS

The exploratory techniques used were those developed during previous Bureau of Commercial Fisheries shrimp work in the North Pacific (Ronholt 1963) and other regions. Modifications were made to satisfy the needs of the local conditions.

DRAG SAMPLING PROCEDURE: In a few instances, fishing stations were occupied where prior information had indicated that shrimp were concentrated. For the most part, fishing stations were completed in areas not previously sampled with shrimp trawls, or where only limited knowledge of the shrimp resources was available. In those areas, an attempt was made to fish all the bays with suitable trawling grounds. In the offshore areas, fishing was carried on to provide information on the shrimp resources in the gullies and depressions of the Continental Shelf rather than in the shoal areas.

Selection of areas to be fished was determined after U. S. Coast and Geodetic Survey charts of the region were studied. Fishing effort was concentrated primarily on muddy bottom areas between 50- and 100-fathom depths, because previous exploration had found those areas most productive of shrimp. As the vessel traveled over the area selected for sampling, a high-resolution, low-frequency echo-recorder was used to show the nature of the bottom. A drag was usually made if the profile of the bottom was reasonably level and the substrate had a soft consistency. Drags were usually 30 minutes long; timed from the setting of trawl winch brakes to the beginning of hauling the trawl back. Whenever good catches of shrimp were taken, additional drags were made nearby to delineate the extent of the productive ground.

CATCH SAMPLING PROCEDURE: After the trawl warps were hauled in, the trawl doors were secured and the net hauled aboard. The contents of the trawl were emptied onto a sorting table capable of holding 1,000 pounds of shrimp (fig. 3).



Fig. 2 - M/V Paragon, chartered by the U. S. Bureau of Commercial Fisheries during summer 1964.

An unselected sample of shrimp was taken and separated into component species from which estimates were made of the percentage each species contributed to the total shrimp catch. When the catch was large enough, a sample of each shrimp species was weighed and counted to obtain the number of individual shrimp required to make up 1 pound. Intermittently, samples of pink and side-stripe shrimp were measured and their sex determined.



Fig. 3 - Trawl catch being culled on the sorting table, M/V Yaquina.

The remaining shrimp catch was sorted into wire bushel baskets, and total poundage estimates were made from the number of baskets filled. Poundages of each shrimp species were determined by multiplying the total shrimp catch by the percentage estimates.

Dominant fish species and species groups were also sorted into bushel baskets. Estimates of miscellaneous invertebrate groups and debris were made by eye.

All halibut, plus king, Dungeness, and tanner crabs were sorted from the catch. The total length of each halibut was measured, and the weight estimated. The sex and number of king and Dungeness crabs, and the number of adult tanner crabs were recorded, and their average weights estimated.

ANALYSIS OF DATA

The size of the trawls used for the shrimp explorations varied somewhat from year to year. In these studies, the shrimp catching ability of the 40-foot flat trawl and the 40-foot semiballoon trawl is considered to be identical, and those trawls are taken as the standard unit of gear. Through much of the 1962 explorations, a 70-foot semiballoon trawl was used. We assume that the 40-foot trawl has four-sevenths the spread of the 70-foot trawl. For comparative purposes, therefore, a factor of 0.6 was used to convert the catch of the 70-foot trawl.

The average duration of the drags also varied from year to year. In 1962, the drags were usually 1-hour long; in 1963-64, they were usually 30 minutes. Therefore, the 1962 catch figures have been converted to expected pounds per standard gear per 30 minutes of trawling. The 1963-64 catch figures are actual pounds per standard gear per about 30 minutes of trawling.

A few drags were considered to be ineffective because the absence of bottom organisms suggested that the trawl was not functioning properly. Other drags in which a large portion of the catch was lost due to damage or for other reasons were also considered as ineffective drags.

AREAS

During the 1962-64 shrimp cruises, the perimeter of the Gulf of Alaska from Cape Suckling to Unalaska Island (including parts of Prince William Sound, southern Cook Inlet, and Shelikof Strait) and selected areas of Bering Sea and Bristol Bay were explored (fig. 4). A general description of the Continental Shelf and Slope and the salient oceanographic conditions prevailing throughout that area is given by Alverson, Pruter, and Ronholt (1964).

To facilitate cruise planning and comparative evaluation of catch data, the explored areas were divided into eight geographic entities (fig. 4). These are as follows:

AREA A encompasses the Continental Shelf from Cape Suckling to Nuka Island and Prince William Sound. In that area, much of the Continental Shelf is over 50 fathoms deep. Prince William Sound has few shoal areas less than 50 fathoms, and much of the area has depths over 100 fathoms. For the most part, areas of less than 50 fathoms have sand, gravel, shell, or hard bottoms. In the deeper areas, gray mud predominates. The bottoms are generally favorable for trawling operations throughout area A, which was the most extensively covered, with 37 percent of the total effort.

AREA B includes the regions adjacent to southern Kenai Peninsula, northern Shelikof Strait, and southern Cook Inlet including Kachemak Bay. Cook Inlet and Kachemak Bay are extensive shoal areas less than 50 fathoms, whereas much of Shelikof Strait is over 100 fathoms deep. Bottom sediments in the shoal areas are predominantly sand, gravel, or shell with mud in the deeper reaches of Shelikof Strait. The bottoms are poor for trawling (fig. 5) between Kenai Peninsula and Afognak Island, but generally favorable for trawling in Cook Inlet, Kachemak Bay, and Shelikof Strait. Area B received 16 percent of the total effort expended.

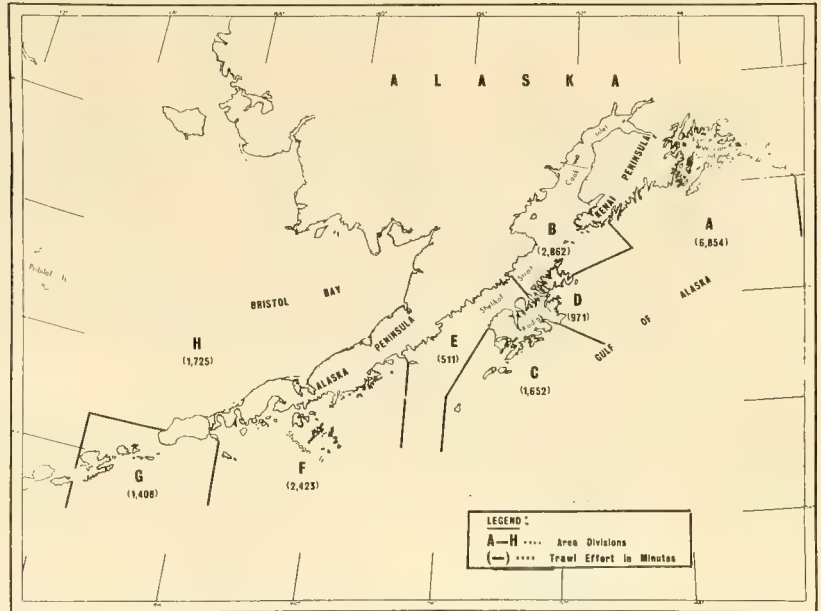


Fig. 4 - Map depicting the area of the Gulf of Alaska and Bering Sea where shrimp explorations were conducted during summers of 1962 through 1964.



Fig. 5 - Trawl net damaged by towing over coral bottom.

curve. In that area, Portlock and Chiniak Grounds are extensive shoal areas intersected by depressions and gullies (Marmot Gully, Chiniak Gully). Sand, gravel, shell, and hard bottoms predominate in the shoal areas, with patches of mud occurring in the deeper areas. Nearly all the trawl effort in area D was concentrated in outer Marmot Bay and Marmot and Chiniak Gullies. Less than 5 percent of the total effort was expended in area D.

AREA E includes lower Shelikof Strait and extends westward along the Alaska Peninsula to Sutwik Island. Shoal areas less than 50 fathoms are not extensive in area E except around Semidi Islands. A deep gully over 100 fathoms deep extends inshore between Chirikof and

AREA C encompasses the Continental Shelf south of Kodiak Island. Much of the shelf in that area is less than 50 fathoms deep. Sand, gravel, shell, and hard bottoms predominate throughout area C, except for patches of mud bottom in the bays of Kodiak Island and in the gullies of Albatross Bank. Though previous explorations reported poor trawling conditions in that area, our trawls were not damaged. Area C received 9 percent of the total effort.

AREA D includes Marmot and Chiniak Bays and offshore to the 100-fathom depth

Semidi Island and up into Shelikof Strait. The shoal areas have sand, shell, and hard bottoms, whereas the deeper areas have mud bottoms. The bottoms are generally favorable for trawling throughout Shelikof Strait and in Shelikof Gully but very poor in the shoals along the Alaska Peninsula. Area E, with only 3 percent of the total effort, received the least coverage.

AREA F encompasses the Continental Shelf from Sutwik Island to Cape Pankof on Unimak Island. The shelf is quite extensive to the east but decreases in width to the westward. East of the Shumagin Islands, a depression with depths greater than 50 fathoms extends from Sutwik to Shumagin Islands and separates the inshore shoals from an extensive shoal offshore. West of the Shumagin Islands, much of the shelf is less than 50 fathoms, but with numerous depressions in the bays and straits between the islands. Sand, gravel, shell, and hard bottom predominate in the shoal areas with patches of mud in the depressions and gullies. The bottoms in the large gully east of Shumagin Islands, in most of the bays along the Peninsula, and in the deeper offshore regions are suitable for trawling. About 13 percent of the total effort was expended in area F.

AREA G includes the Continental Shelf south of Unimak Island to eastern Unalaska Island the limited Shelf on the Bering Sea side from Cape Sarichef to Makushin Bay. The Continental Shelf in this area (Davidson Bank) is most extensive south of Unimak Island. The sea bottom is hard throughout much of this area, but snags were not encountered and the trawls were not excessively damaged. Area G received 8 percent of the total effort.

AREA H encompasses the extensive Continental Shelf of the Bering Sea south of the Pribilof Islands, including Bristol Bay. Much of that region has shoal areas less than 50 fathoms. The 50-fathom depth curve extends offshore for a maximum of 300 miles from inner Bristol Bay, and the 100-fathom curve is 100 miles farther out at some locations. In Bristol Bay, the bottom is predominantly mud, changing to sand, gravel, and shell in the offshore Bering Sea, and changing again to mud along the edge of the Continental Shelf and Slope. The bottoms are favorable for trawling throughout the Bering Sea. Although 9 percent of the total effort was expended in area G, it was poorly covered because of its great size.



Fig. 6 - "Clean" catch consisting predominantly of pink shrimp.

RESULTS

In his discussion of earlier (1950-60) Bureau of Commercial Fisheries shrimp explorations in Alaska and elsewhere, Ronholt (1963) discusses the validity of his data in assessing total population sizes. He states that "general conclusions of inter-area abundance must be considered relative and perhaps more indicative of availability than of true abundance." While the same generalities apply to our results, sampling during the 1962-64 explorations was more intensive and in a more restricted area than the earlier work. From an overall analysis, the results for the waters off Central Alaska and Alaska Peninsula agree quite closely with those of the 1954-59 explorations. It is strongly suggested, therefore, that the present findings are reasonably accurate measures of the areal abundance of pandalid shrimp in the northern Gulf of Alaska during the "summer" season.

During the 1962-64 cruises 118,200 pounds of shrimp were caught. The principal species were pink (Pandalus borealis), side-stripe (Pan-

dalopsis dispar), humpy (*Pandalus goniurus*), coonstripe (*P. hypsinotus*), and other species (primarily *P. montagai*, *Argis* species, and *Crangon* species).

Pink shrimp accounted for 72 percent (by weight) of the total shrimp catch (fig. 6). This species was caught in all areas along the perimeter of the Gulf of Alaska and in the Bering Sea, but not in Bristol Bay. Throughout that entire area, catches per drag ranged from 0 to 3,000. The pink shrimp was the smallest and varied the most in size of the four shrimp species caught in large quantities. Pinks, taken during the three cruises, averaged 90 count and ranged from 40 to 297 per pound (fig. 7).

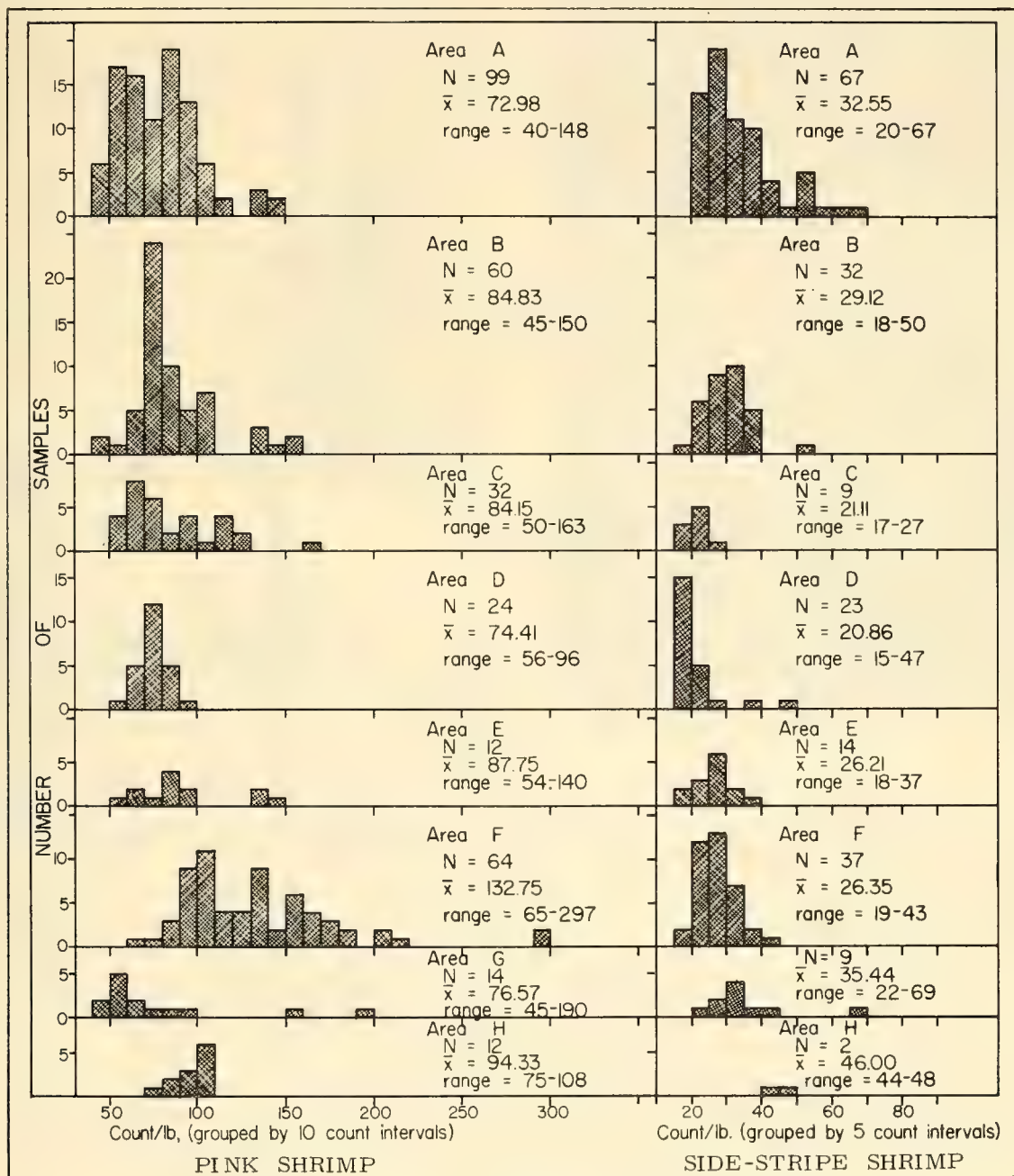


Fig. 7 - Distribution of count per pound samples of pink and side-stripe shrimp by areas.

Side-stripe shrimp was the second most abundant species, representing 18 percent of the total shrimp catch. This species was caught in all areas explored except on the Continental Shelf of the Bering Sea and Bristol Bay. Catches per drag of side-stripe shrimp ranged from 0 to 2,270 pounds.

Although not as abundant as pink shrimp, side-stripe shrimp are of particular interest since they represent a comparatively large pandalid variety which does not now support a sustained commercial fishery in Alaska or elsewhere (fig. 8). Side-stripe shrimp taken during the three cruises averaged 29 count, or three times larger than pink shrimp. Counts per pound of this species ranged from 15 to 67 shrimp (fig. 7).



Fig. 8 - A sample of the larger side-stripe shrimp being weighed.

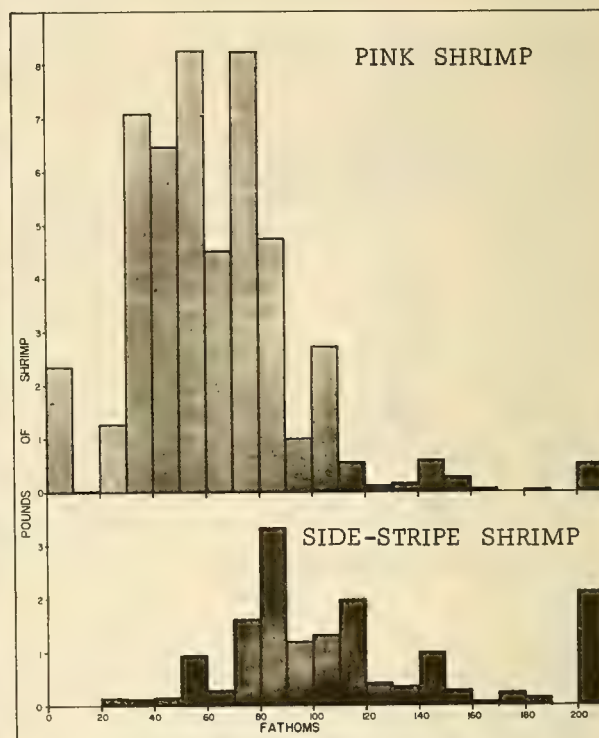


Fig. 9 - Catch per minute of trawling of pink and side-stripe shrimp by 10-fathom intervals.

Pink and side-stripe shrimp accounted for 90 percent of the total shrimp catch. Both species were frequently taken in large quantities in the same drags; however, the best side-stripe catches tended to be at greater depths than pink shrimp. During the summer season in the Gulf of Alaska, the best catches of pink shrimp were at depths of less than 80 fathoms; and for side-stripe shrimp, greater than 80 fathoms (fig. 9).

Humpy shrimp accounted for 6 percent of the total shrimp catch and were caught in all areas along the perimeter of the Gulf of Alaska and in northern Bristol Bay, but not along the Continental Slope of the Bering Sea. This species was taken more frequently in the bays and inlets than in the offshore areas. Catches ranged from 0 to as much as 1,000 pounds per drag. This species is comparable in size to pink shrimp. Throughout the explored areas, they averaged 82 count and ranged from 48 to 172 count.

The coon-stripe shrimp represented 3 percent of the total shrimp catch. This species was caught in all areas along the perimeter of the Gulf of Alaska, but was not taken in the Bering Sea and Bristol Bay. Coon-stripe shrimp, like humpy shrimp, were caught more frequently in the bays and inlets than in the offshore areas and were never caught in quantities equal-

ing the catches of the other three common shrimp. Catch per drag of coon-stripe shrimp ranged from 0 to 320 pounds. Coon-stripe shrimp is a species more comparable in size to side-stripe shrimp, averaging 38 count throughout the Gulf of Alaska. This species ranged from 8 to 99 count, which was much greater than for side-stripe shrimp (fig. 10).

The catches of pink and side-stripe shrimp varied tremendously from area to area. The relative abundance (catch per minute of trawling) and large catches of these shrimp in the eight areas are discussed below by areas; repetitious reference to table 1 and figs. 11 and 12 will thus be avoided.

AREA A: The catch rate of pink shrimp was the second lowest of all areas with an average catch per minute of trawling of 1.25 pounds. Total catches as much as 750 pounds were made, but most drags made small catches. In only 14 of the 151 drags did the catch of this species exceed 100 pounds. Of those, three drags southeast of Montague Island (Prince William Sound) produced 500- to 750-pound catches during the 1962 cruise.^{2/}



Fig. 10 - The larger pandalid species caught in the Gulf of Alaska; left, coon-stripe shrimp; right, spot shrimp; bottom, side-stripe shrimp.



Fig. 11 - Frequency distribution of catches of pink and side-stripe shrimp by areas.

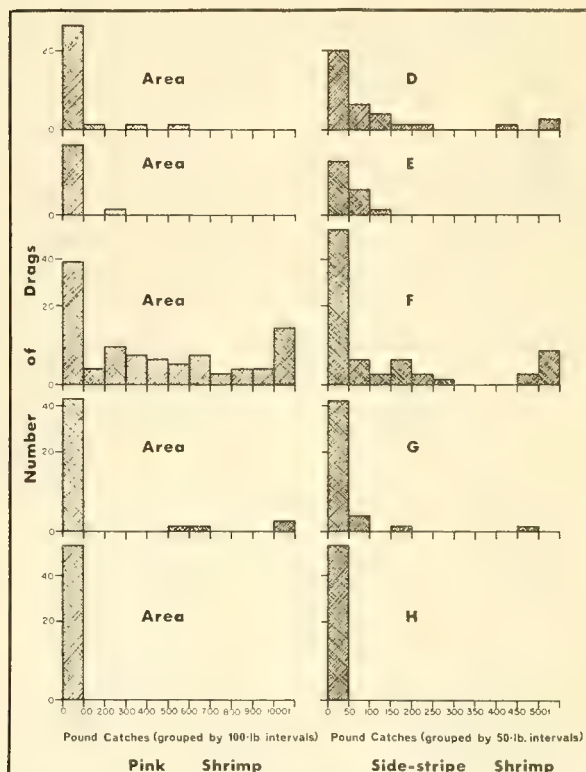


Fig. 12 - Frequency distribution of catches of pink and side-stripe shrimp by areas.

^{2/}The catch figures for 1962 have been converted to expected pounds per standard gear per 30 minutes of trawling.

Table 1 - Results by Area of the Effort Expended, Total Shrimp Catch, and Catch of Principal Shrimp Species

	Areas							
	A	B	C	D	E	F	G	H
No. drags	151	93	55	33	18	82	48	59
Total min.	6,854	2,862	1,652	971	511	2,423	1,408	1,725
Total lbs.	10,379	20,334	22,671	5,254	884	53,695	4,627	356
Catch/drag	68.73	218.64	412.20	159.21	49.11	654.81	96.40	6.03
Catch/min.	1.51	7.10	13.72	5.41	1.72	22.16	3.99	0.20
Pink shrimp	8,619	14,904	16,039	1,696	325	39,338	3,639	314
Catch/drag	57.07	160.23	291.61	51.39	18.05	479.73	75.81	5.32
Catch/min.	1.25	5.20	9.70	1.74	0.63	16.23	2.58	0.18
Side-stripe shrimp	1,414	3,405	1,681	3,520	543	9,806	854	21
Catch/drag	9.36	36.63	30.56	106.66	30.16	119.58	17.79	0.35
Catch/min.	0.20	1.19	1.01	3.62	1.06	4.04	0.61	0.01
Coon-stripe shrimp	34	1,289	926	25	6	1,527	68	-
Catch/drag	0.22	14.15	16.83	0.75	0.33	18.86	1.42	-
Catch/min.	0.00	0.45	0.56	0.02	0.01	0.63	0.05	-
Humpy shrimp	60	660	3,710	5	-	2,878	1	-
Catch/drag	0.39	7.09	67.45	0.15	-	35.09	0.02	-
Catch/min.	0.00	0.23	2.24	0.00	-	1.18	-	-
Other	153	71	274	-	8	126	65	21
Catch/drag	1.01	0.76	4.98	-	0.44	1.53	1.35	0.35
Catch/min.	0.02	0.02	0.30	-	0.01	0.05	0.05	0.01

Pink shrimp in area A were not abundant, but were the largest of any area and averaged 73 count per pound. They ranged from 40 to 148 per pound. The 40-per-pound pink shrimp were the largest taken during the three cruises (fig. 7).

The side-stripe catch rate was also the second lowest of all areas with an average catch of 0.20 pounds per minute of trawling. Catches ranged from 0 to 240 pounds, but only 7 drags produced 50 or more pounds.

AREA B: The average catch rate of pink shrimp was 5.20 pounds per minute of trawling. Catches ranged from 0 to 2,175 pounds and large catches were made in a number of drags. Of the 93 drags completed, 22 produced between 100 and 499 pounds, 6 between 500 and 999 pounds, and 3 over 1,000 pounds. The 500- to 999-pound catches of pink shrimp were made in three drags in Nuka Passage (Kenai Peninsula), two drags in northern Shelikof Strait, and one drag in Tonki Bay (Afognak Island). Catches over 1,000 pounds were made in two drags in Viekoda Bay and one drag in Terror Bay (Kodiak Island).

Side-stripe shrimp were caught at an average rate of 1.19 pounds per minute of trawling. Total catches of this shrimp ranged from 0 to 420 pounds, with 8 drags producing between 50 and 249 pounds and 6 drags producing between 250 and 420 pounds. Five of the 250- to 420-pound catches were made in northern Shelikof Strait and the other was made in Viekoda Bay (Kodiak Island).

AREA C: The average catch rate of pink shrimp was the second highest of all areas with a rate of 9.70 pounds per minute of trawling. Total catches per drag ranged from 0 to the largest pink shrimp catch of 3,000 pounds. Of the 55 drags completed, 14 produced catches between 100 and 499 pounds, 4 between 500 and 999 pounds, and 4 over 1,000 pounds. Fishing was concentrated around southeastern Kodiak Island, with 1 drag in Ugak Bay, and 2 drags offshore of Two-Headed Islands.

The average catch of side-stripe shrimp per minute of trawling was 1.01 pounds. Total catches per drag of this species ranged from 0 to 630 pounds, but catches exceeding 50 pounds were made in only seven drags. Of the total drags, 5 drags produced between 50 and 249 pounds, one drag produced 450 pounds, and another 630 pounds. The two largest catches in Alitak Bay (Kodiak Island) greatly affected the average catch rate of side-stripe shrimp in area C.

Catch rates of humpy shrimp and other species were the highest of any area, with rates of 2.24 and 0.30 pounds, respectively, per minute of trawling.

AREA D: The average catch of pink shrimp was 1.74 pounds per minute of trawling. The range of catches varied from 0 to 510 pounds, but most catches were small. Thirty-three drags were completed in that area; only 2 had catches between 100 and 499 pounds, and another had 510 pounds which were taken in outer Marmot Bay.

The side-stripe catch rate of 3.62 pounds per minute of trawling was the second highest of all areas. Catches per drag ranged from 0 to 1,260 pounds with 13 drags producing catches over 50 pounds. Of those, 11 drags caught between 50 and 249 pounds and 2 others had catches of 540 and 1,260 pounds. The two large catches were made in outer Marmot Bay.

Side-stripe shrimp taken in area D were the largest of any area, averaging slightly less than 21 count per pound. The samples had from 15 to 47 shrimp per pound. The 15-count side-stripe shrimp were the largest taken during the three cruises.

AREA E: The pink shrimp catch rate averaged only 0.63 pounds per minute of trawling. Catches per drag ranged from less than 1 to 200 pounds. The 200-pound catch was the only one over 100 pounds.

In that area, as in area D, the catch rate of side-stripe shrimp exceeded that for pink shrimp. Side-stripe shrimp were caught at an average rate of 1.06 pounds per minute of trawling. Catches in the 18 drags completed in the area ranged from 0 to 100 pounds. Six of the drags caught over 50 pounds.

AREA F: The highest average catch rate for pink shrimp of 16.23 pounds per minute of trawling occurred in this area. Catches ranged from 0 to 2,800 pounds, and large catches were made in a number of drags. Of the 82 completed drags, 22 produced catches between 100 and 499 pounds, 18 between 500 and 999 pounds, and 13 over 1,000 pounds. Most of the large catches were made in and around bays along the south side of the Alaska Peninsula. Catches of 500 to 999 pounds were made in 3 drags in Pavlof Bay, 3 drags around Ivanof Bay, 2 drags in Morzhovoi Bay, 2 drags in Unga Strait, and 1 drag each in Stepovak Bay and around Mitrofan Bay. The 1,000-pound-plus catches of pink shrimp were made in 2 drags in Castle Bay, 5 drags in Stepovak Bay, and 1 drag each in Beaver and Morzhovoi Bays.

In more offshore areas, 500- to 999-pound catches were made in 2 drags in West Nagai Strait (Shumagin Islands), 2 drags in Sanak Gully, and 1 drag in the large gully east of the Shumagin Islands. Catches of more than 1,000 pounds were also made in West Nagai Strait (1 drag), Sanak Gully (1 drag), and in the gully east of the Shumagin Islands (1 drag).

Although the catch rate of pink shrimp greatly exceeded rates in other areas, pinks were, on the average, much smaller. Pink shrimp averaged 132 per pound--in no other area did the average exceed 100 per pound (fig. 7). The count per pound range of 65 to 297 was greater than other areas. Four samples of smaller than 200 count were taken of which the 297 count was the smallest of the three cruises.

As with pink shrimp, the best fishing for side-stripe shrimp was in area F with an average catch rate of 4.04 pounds per minute of trawling. During the three cruises, catches ranged from 0 to 2,270 pounds. More than 50 pounds of side-stripe shrimp were taken in each of 24 drags, of which 14 produced catches between 50 and 249 pounds, 3 between 250 and 499 pounds, and 7 over 500 pounds. Drags in Morzhovoi Bay, Unga Strait, and outside of Stepovak Bay each produced catches of 250 to 499 pounds. Catches of side-stripe shrimp of over 500 pounds were made in Kuiukta, Chignik, Mitrofan Bay, Stepovak (2 drags) Bays, and in Unga and West Nagai Straits.

Humpy shrimp were caught at an average rate of 1.18 pounds per minute of trawling in this area. The largest single catch of 1,000 pounds was made in Belkofski Bay (Alaska Peninsula).

The highest average catch rate for coon-stripe shrimp was in area F, where 0.63 pounds were taken per minute of trawling. The largest catch of 320 pounds was made in Beaver Bay (Alaska Peninsula).

AREA G: The average catch rate of pink shrimp was 2.58 pounds per minute of trawling. Catches ranged from 0 to as much as 1,200 pounds, but only four drags produced catches over 100 pounds: one drag each in Unimak Pass and Beaver Inlet (Unalaska Island) yielded catches between 500 and 999 pounds and one drag each off Cape Pankof (Unimak Island) and in Unalaska Bay (Unalaska Island) took over 1,000 pounds. The four drags greatly increased the average catch rate for area G.

The side-stripe catch rate averaged 0.61 pounds per minute of trawling. Catches in the 48 completed drags ranged from 0 to 430 pounds. Most of the catches were small, however, with only 4 drags taking between 50 and 249 pounds and 1 drag catching 430 pounds. This largest catch was made in Beaver Inlet (Unalaska Island).

AREA H: The pink and side-stripe shrimp catch rates were the lowest of all areas with an average catch per minute of trawling of 0.18 and 0.01 pounds, respectively. The two species were not found in large concentrations in the Bering Sea or Bristol Bay. Catches per drag of pink shrimp ranged from 0 to 49 pounds. Catches of side-stripe shrimp ranged from 0 to 15 pounds.

INCIDENTAL INVERTEBRATE AND FISH CATCHES

Shrimp trawls probably are not effective sampling gear for most organisms other than shrimp because of the limited area covered and the slow speed at which the trawls are towed. Incidental catches of other species in a series of standardized tows, however, will provide indications of relative abundance.

The incidental catches of crabs caught during the summer cruises of 1963 and 1964 are summarized in table 2. Of the three commercial crab species, king crab (*Paralithodes camtschatica*) was the most commonly encountered. More individuals of both males and females were caught in the area from Kodiak Island to Bristol Bay (1964 cruise) than from Prince William Sound to Kodiak Island (1963 cruise). The second most commonly caught species was adult tanner^{3/} crab (*Chionoectes* species). Although tanner crabs are not now intensively utilized by American nationals, this species may become commercially important. Russians and Japanese have been catching this species. Only occasional Dungeness crabs were taken throughout the explorations; they were especially scarce during the 1964 cruise.

Year	King Crab		Dungeness	Tanner	Halibut
	Male	Female			
1963 . . .	366	317	169	1/800	143
1964 . . .	454	478	18	562	532
Total .	820	795	187	1,362	675
1/Estimated figure derived by dividing pounds of tanner crab caught by 3.					

Pacific halibut (*Hippoglossus stenolepis*) were not taken in great numbers during either 1963 or 1964 (table 2); however, a single catch of 252 immature individuals was made in inner

Table 3 - Pounds of Indicated Fish Species Caught during 1963 and 1964

Year	Catch of Flatfish			Catch of Other Fish				
	Turbot	Flathead	Other ^{1/} Flatfish	Pollock	Rockfish ^{2/}	Foodfish	Sculpins	Incidental Species ^{3/}
1963	3,218	1,403	654	4,145	550	730	807	385
1964	12,178	4,962	3,752	4,642	2,426	2,189	3,280	1,076
Total	15,396	6,365	4,406	8,787	2,976	2,919	4,087	1,461
1/Includes primarily yellowfin, rock, rex, dover, English, lemon soles.								
2/Primarily Pacific ocean perch, also rough-eye, northern, sharpchin, dusky rockfishes.								
3/Includes true cod, black cod, herring, smelt.								

3/Only marketable-size tanner crabs were counted.

Bristol Bay, a known nursery area for halibut. Even when this catch is disregarded, halibut were taken more commonly during the 1964 cruise than in the previous year.

The incidental catches of common fish species and species groups are summarized in table 3. The 2-year total of incidental catches of fish consisted of 56 percent flatfish and 44 percent other fish.

Arrowtooth flounder (*Atheresthes stomias*) was the most commonly caught species and accounted for 33 percent of the total fish catch. Catches of that species ranged from 0 to 500 pounds per drag. The next most abundant species was walleye pollock (*Theragra chalcogrammus*), which constituted 19 percent of the total fish catch. Walleye pollock catches ranged from 0 to 500 pounds per drag. Flathead sole (*Hippoglossoides elassodon*) was the third most abundant species, constituting 14 percent of the total fish catch, and 0 to 450 pounds per drag were taken.

The remainder of the incidental fish catches is lumped in species groups. Included are other flatfish which contributed 9.5 percent; sculpins, 9 percent; rockfish, 6.5 percent; other food fish, 6 percent; and other fish, 3 percent of the total catch of incidental fish.

RESOURCE POTENTIAL

Explorations by the Bureau of Commercial Fisheries have shown shrimp to be locally abundant in several areas of Alaska, and indications are that the resource could support a sizable fishery. The abundance and commercial potential of the resource are even more dramatically demonstrated by the shrimp landings of commercial vessels in the newly developed fishery. Two commercial vessels operating off southern Kodiak Island averaged over 3,000 pounds of shrimp per hour of trawling after commercial shrimp operations began there (table 4).

	No. of Drags	Average Length of Drags	Total Catch of Shrimp	Per Hr.
		Minutes	(Lbs.)	
Vessel A (1963)	94	112	557,500	3,168
Vessel B (1961)	271	79	1,412,000	3,933

The ocean pink shrimp (*Pandalus jordani*), a species comparable in size to Alaska pink shrimp, has a fishery off the coasts of Washington and Oregon. Magill and Erho (1963) provide data on catch per unit effort of vessels fishing shrimp in that area. Vessels fishing out of Washington averaged catch rates of 730 pounds per hour during 1957, and Oregon vessels averaged 495 pounds per hour in 1958. The figures for 1957 and 1958 are catch rates for the first years that shrimp were landed in any great amounts in Washington and Oregon. They are much less than the catch rates over 3,000 pounds per hour trawling of the two commercial vessels operating off Kodiak Island. The catch rate statistics for the Kodiak area indicate there is a much greater shrimp potential there than off the Washington and Oregon coasts. Furthermore, exploratory fishing cruises have demonstrated that catch rates of other areas exceed those off southern Kodiak Island. Also, although the bulk of the shrimp resource in Alaska is small shrimp, there are significant quantities of shrimp of a size comparable to the small "40-count" shrimp marketed from the Gulf of Mexico fishery. Considering these factors, the as-yet-undeveloped shrimp resources of Alaska waters have an impressive potential.

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Note: Cruise reports and detailed fishing logs of the three shrimp exploratory cruises summarized in this report are available and may be obtained by writing to the U. S. Bureau of Commercial Fisheries Exploratory Fishing and Gear Research Base, Box 2481, Juneau, Alaska 99801.



HADDOCK NEVER HAD IT SO GOOD

The bright, new way to prepare haddock is Haddock Delmonico, created for you by the United States Department of the Interior's Bureau of Commercial Fisheries. In this kitchen-tested recipe, named after the famous New York restaurant; the rich, meaty haddock is combined with lemon juice, grated onion, and hot pepper sauce, then baked just long enough to bring out the full, delicious flavor. The haddock is served with whole cranberry sauce; a colorful, complementary combination that really "goes together."

Haddock fillets are available fresh or frozen throughout the country. They are an easy-to-do, easy-on-the budget specialty, ready to bring the "tang of the sea" flavor to your dinner table.

HADDOCK DELMONICO

2 pounds haddock fillets or other fish fillets, fresh or frozen	$\frac{1}{8}$ teaspoon salt
$\frac{1}{4}$ cup butter or margarine, melted	$\frac{1}{8}$ teaspoon liquid hot pepper sauce
2 tablespoons lemon juice	Dash pepper
1 teaspoon grated onion	Chopped parsley
	1 can (1 pound) whole cranberry sauce



Thaw frozen fillets. Skin fillets. Cut into serving-size portions and place in a well greased baking dish, 12 x 7 $\frac{1}{2}$ x 2 inches. Combine butter, lemon juice, onion, and seasonings; pour over fish. Bake in a moderate oven, 350° F., for 25 to 30 minutes or until fish flakes easily when tested with a fork. Sprinkle with parsley and serve with cranberry sauce. Serves 6.

GEAR AND TECHNIQUE OF THE SEA BASS TRAP FISHERY IN THE CAROLINAS

By J. B. Rivers*

ABSTRACT

An increasing number of shrimpers along the Carolina Coasts have diversified fishing activities by producing black sea bass (*Centropristes striatus*) in commercial quantities. Utilizing baited wire traps similar to those used in the Chesapeake Bay crab fishery, two-man boats have made landings ranging up to 6,300 pounds of salable fish. As a daytime fishery, 15 to 20 units of gear, each consisting of a trap, polyethylene line and bamboo flag buoy, are fished along the 10 fathoms curve. The catch, sold in the round, is handled by local dealers or trucked to northern markets and is completely dependent upon market supply and demand.

BACKGROUND

The end of the regular shrimp season along the North and South Carolina coasts of the United States marks the beginning of a long, unproductive lay-up for the small 35- to 50-foot shrimp vessels (Sundstrom 1957) and their crews. The larger vessels, if capable, generally move southward to the more productive grounds either off the coast of Florida in the Cape Kennedy and Key West areas, or into the Gulf of Mexico because those shrimp grounds have more to offer the shrimp fishermen than the coast of the Carolinas during the winter months.

In 1960, small vessels (35-45 feet) from various ports in the Carolinas began catching sea bass (*Centropristes striatus*) with wire-mesh crab traps. Landings have steadily increased since the beginning of the fishery so that the total production is now close to 2 million pounds (table).

SEASON

The traps are set in depths of about 10 fathoms along the North and South Carolina coasts from the end of the shrimp season in early winter to the start of the new shrimp season in the spring.

Winter weather conditions along that section of the coast constitute a major problem in the fishery by limiting the number of fishing days. A combination of rough seas and small vessels does not provide safe and comfortable conditions, nor does it encourage the recruitment of new personnel or vessels into this new fishery.

VESSELS USED

The vessels now used in the fishery range in size and description from the regular shrimp vessels (fig. 1) and fancy 20-foot sport fishing boats, to a 110-foot World War II converted rescue vessel that operates as a charter fishing boat during the tourist season.

All the shrimp vessels are equipped with a standard trawling winch, which they use for mechanically hauling the traps. The winch heads are somewhat inefficient. Modifications to increase their hauling speeds would increase the efficiency of the operation by reducing the hauling time of each unit.

Some of the vessels such as those previously engaged in sport and party fishing have improvised hauling gear powered by small air-cooled gasoline engines. A small radial davit at the railing (fig. 2) with an open block facilitates quick and easy handling of the trap warp.

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Black Sea Bass Trap Fishery Landings in North and South Carolina		
Year	North Carolina	South Carolina
1964	240,100	224,700
1963	197,563	264,000
1962	304,033	261,000
1961	327,255	29,000
1960	81,300	13,000
Total	1,150,251	791,700



Fig. 1 - A South Carolina vessel, with fish traps and gear stacked on the stern, preparing to depart for the fishing grounds.



Fig. 2 - Hauling traps with a small davit and open block.

None of the vessels is equipped with radar, loran, or any of the newer electronic fish-finding devices that incorporate the use of the "white line" or the cathode ray tube means of presentation. Most of the vessels use echo-sounders with flashing-light bottom indicators. Some are equipped with recorders that give a graphic presentation of the contour of the ocean floor (fig. 3). Those recorders are more sensitive and register the slightest rise or indentation, which usually indicates the most suitable bottom for catching fish.



Fig. 3 - Depth-recorder tracings are intently observed as the vessel proceeds over or near the prospective areas to conduct the fishery.

GEAR

The principal gear used in this fishery is the Chesapeake Bay crab trap, similar to that described by Isaacson (1957). It can be purchased either completely assembled (current price \$4) or in sections (\$1.80) to be assembled by the fishermen. Associated gear (fig. 4) includes a $\frac{1}{4}$ -inch diameter, 3 strand polyethylene line attached directly to the bottom of the trap and to the marker buoy. The warp-scope ratio is 1.5 to 1 (i.e., 15 fathoms of warp in 10 fathoms of water). The mark-

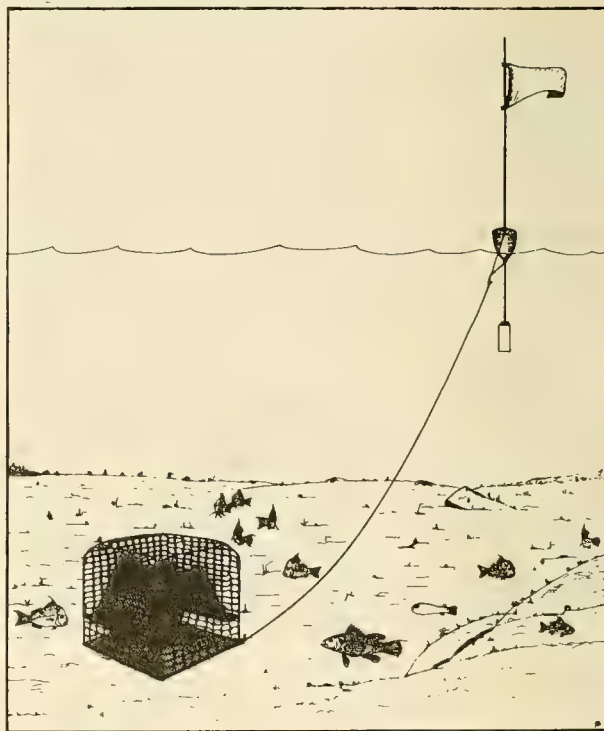


Fig. 4 - Diagram of trap and associated gear which includes $\frac{1}{4}$ -inch diameter, 3-strand polyethylene line attached to a marker buoy.

er buoy consists of a bamboo pole, 12 to 14 feet long, with flotation provided by a standard conical crab pot buoy with a hole drilled through the middle. The underwater end is embedded in a 1-quart plastic milk container filled with cement. This acts as a counterbalance and maintains the pole in an upright position for easier sighting and identification. Colored cloths that will not blend in with the sea and sky are used for flags. Some of the fishermen paint numbers on the flags to help them remember the sequence of their setting pattern. The shoal depths of the area fished, combined with only moderate currents, allow the traps to remain stationary on the bottom without anchors.

FISHING OPERATION

Since this is a daytime fishery, boats leave the dock in time to arrive on the grounds at sunrise for the fishing operation. The fishing area is generally selected from the results of the previous day's catches or from the captain's experience and knowledge of the fishery.

During the run to the grounds, trap-baiting is completed; the baits are usually menhaden, herring, spot, croaker, or mullet. The most preferable choices are menhaden and herring. Their oily meat appears to excrete a slick that attracts sea bass into the chamber of the trap.

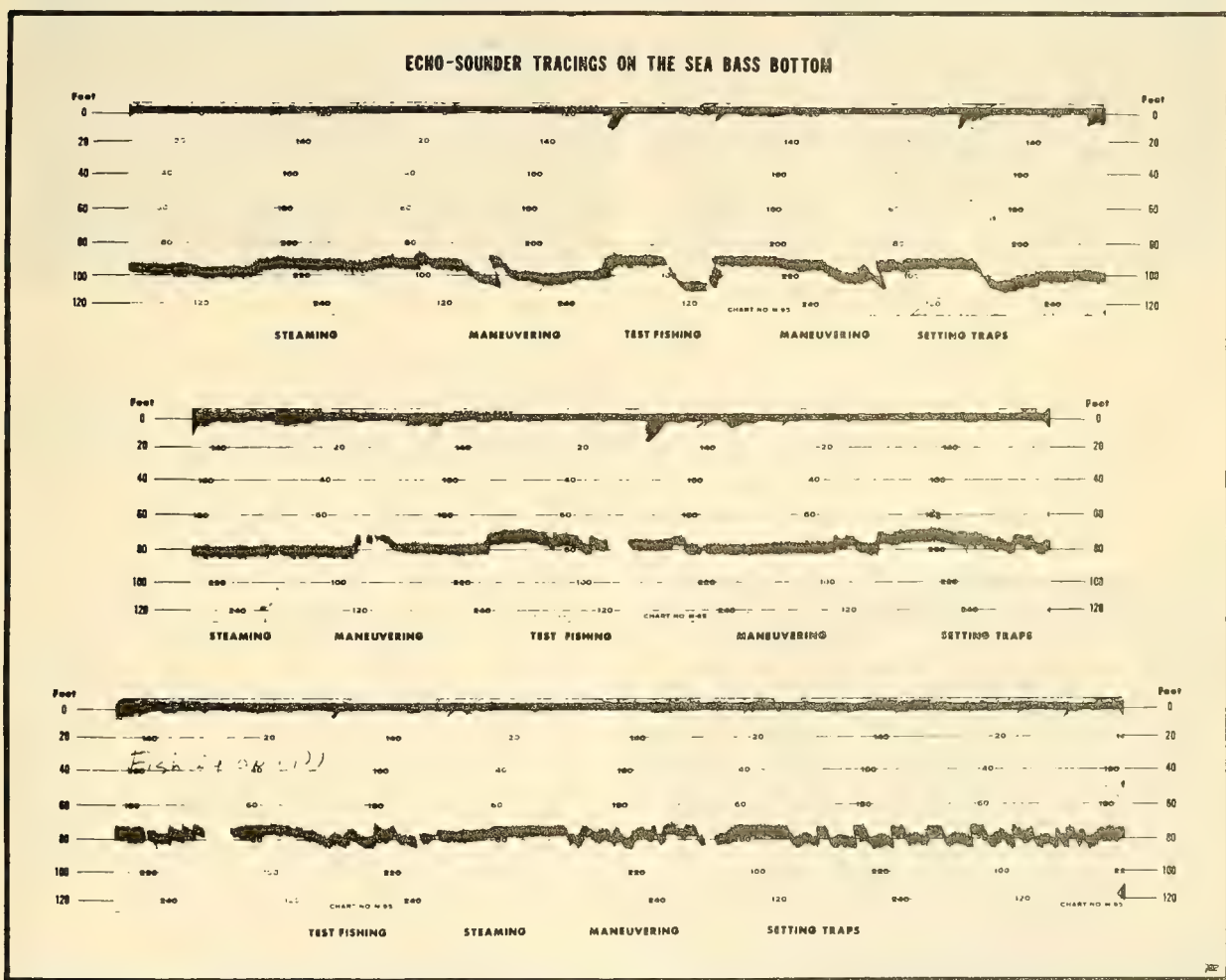


Fig. 5 - Depth-recorder tracings made during the fishing operation off the South Carolina coast. The type of machine that made this tracing does not show indications of fish over the sea bed, but only the contour of the bottom.

Reportedly, some fishermen have placed cans of catfood in their traps. The cans are punctured with holes to permit the escapement of the contents, which attracts the fish towards, and eventually into, the trap. The availability of fresh bait is dependent upon the sources of supply in the various local areas, but frozen bait is readily available to the fishermen. The current price for frozen bait in the South Carolina area is \$6.18 a hundredweight.

Careful attention is paid to the depth-recorder (fig. 5) for indications of significant changes in the topography of the sea floor. Whenever changes are registered, a test is made of the area using rod and reel, or hand lines with baited hooks (fig. 6).



Fig. 6 - Areas indicative of good catches are first tested with baited hooks and lines prior to setting the traps.



Fig. 7 - Awaiting the signal from the captain, the striker stands ready to set the trap.

After the boat is maneuvered over the selected spot, a signal is given to the striker and setting begins (fig. 7). The setting pattern may take varied designs, either in a straight line or in a circular plan, but each trap is set as a single unit. Regardless of the pattern, the traps are set as close as possible to the most promising area selected from the results of the hand-line test fishing. Rapidity and continuity of setting is maintained by the careful and neat stacking of traps, buoy lines, and buoy (fig. 8). The gear is set without delay whenever a productive area is located to get the maximum fishing time and to avoid drifting away from a select area.

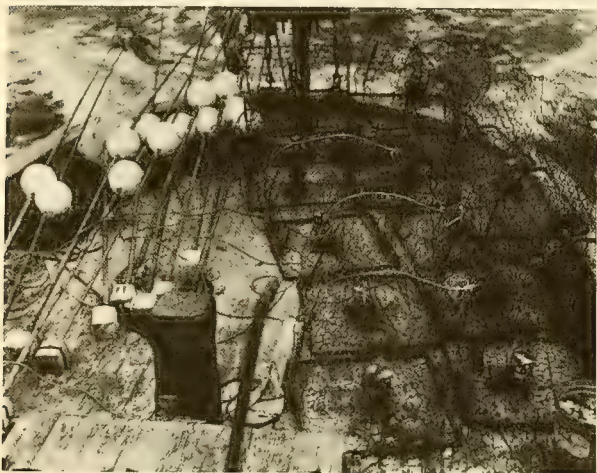


Fig. 8 - Buoys and lines are carefully stacked with lines neatly coiled to prevent fouling.

Fishing time ranges from 20 to 45 minutes for each trap, depending upon the setting pattern. The tighter or closer the pattern, then less time is spent maneuvering; more time is consumed in retrieving the gear when the pattern is broader or spread out over a large area.

A 2-man vessel fishes an average of 15-20 traps a day. Larger vessels with 5-man crews can work as many as 40 traps daily, and then at night may move into the deeper water along the edge of the Continental Shelf to hand line for red snapper and grouper.

The most important requirement for successful fishing is the captain's ability to locate the most productive grounds with a minimum loss of time. Grounds must be tested and gear must be set and retrieved in the shortest period possible to maintain a high catch rate per unit of fishing gear.



Fig. 9 - A small catch of sea bass coming aboard. Incidental catches of scup (porgy) or puffers are also included in the traps.



Fig. 10 - Fish are dumped on deck or into a box to be culled prior to storage in the fish hold.

The optimum amount of time to keep the gear on the bottom is thought to be 15 to 20 minutes per trap, because once the bait is gone the effectiveness of the trap is greatly reduced. It appears that sea bass in this area are attracted to the trap for food rather than shelter as opposed to the situation in certain other trap fisheries where unbaited traps are successfully utilized.

When the number of fish caught is temporarily reduced in an area, searches are made to locate a new and more productive area. Again a captain's knowledge of the bottom topography of an area adds to the effectiveness of the fishing operation.

After each trap is hauled (fig. 9), the fish are dumped into a box (fig. 10), and the gear is stacked ready to be used again when needed. If the gear is to be reset the traps must be re-baited.

The fishing gear method of operation is quite dissimilar to those of the older sea bass fishery off the New Jersey coast. The season in that area extends from May to December with June being the most productive month. The Jersey fishermen use the Jersey skiff, a small (26-30') seaworthy boat, which has ample cockpit space for the handling of the gear. A single-man boat sets and tends about 500 traps whereas a two-man boat maintains and operates up to 1,600 traps. Landings have ranged up to 5,000 and 6,000 pounds of black sea bass. Where the Carolinians search for lumps and test fish with hand lines, the northern fishermen seek out wrecks and rough bottom and rely on their electronic devices for the indication and location of commercially significant catches of fish. Another major difference is that the Jersey fishermen use unbaited wooden slat traps (Dumont and Sundstrom 1961), which are set out in strings of 10 or 20 traps per line instead of singly. This technique is similar to the one employed by some of the New England lobstermen. Attempts to increase the trap's productivity has led to some experimentation by the Jersey fishermen. These include using either a mirror or a battery-powered light to attract the fish and lure them into the trap.

SALE OF CATCH

Daily catches have ranged up to 6,300 pounds of sea bass, but the financial success of a trip depends entirely upon the market prices.

At sea the fish are stored in the same type wooden box that is used to pack shrimp for shipment. A layer of crushed ice is spread on the bottom of the box; then the fish, and finally another layer of crushed ice is spread over the fish to maintain the quality of the product.

Fish are sold in the round (not headed or gutted). They are handled locally or shipped to the northern markets. No set price has been established, nor does the price stabilize itself during the season. The fishermen are fully dependent upon the customers' demand and the supply in the market, so the prices during a season have ranged from 4 to 40 cents a pound.

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Note: Appreciation is gratefully extended to Capt. Wright Skinner, Jr. of Georgetown, S. C., for allowing me the opportunity to observe and photograph the fish trap operation on board his vessel Lillian Skinner.



NOVEMBER 1958 SUPPLEMENT OF COMMERCIAL FISHERIES REVIEW STILL AVAILABLE

Copies of the November 1958 Supplement of the monthly periodical Commercial Fisheries Review are still available. This supplement contains articles on the nonsaponifiable fraction of menhaden oil; experimental studies to extend uses of menhaden oil in the leather industry; physical and chemical characteristics of herring, menhaden, salmon, and tuna oils; chemical and nutritional studies of fish oils; fish-oil research at the Seattle Fishery Technological Laboratory of the U.S. Bureau of Commercial Fisheries; utilization of fish-oil derivatives in ore flotation; oxidative deterioration of fish and fishery products; oxidative enzymes in fish tissue.

Requests will be filled on a first-come first-served basis until supply is exhausted. Write to: Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 N. Fort Myer Dr., Rm. 510, Arlington, Va. 22209.

Created in 1849, the Department of the Interior—a department of conservation—is concerned with the management, conservation, and development of the Nation's water, fish, wildlife, mineral, forest, and park and recreational resources. It also has major responsibilities for Indian and Territorial affairs.

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TRENDS AND DEVELOPMENTS

Alaska

KING CRAB WORKSHOP SCHEDULED:

A king crab workshop was sponsored by the Department of the Interior's Bureau of Commercial Fisheries technological laboratory at Ketchikan in Anchorage, Alaska, on February 28, 1966. This was the third Industry-Government meeting held to discuss technological problems of king-crab processing. Purposes of the meeting were to (1) discuss problems and needs of the industry, and (2) discuss a preliminary draft of the USDI Quality Standard for frozen king crab blocks. Immediately following the workshop the Alaska King Crab Quality Control and Marketing Board met to discuss its program for 1966. The Board's approved program for 1966 includes a \$50,000 advertising campaign. At this meeting discussion of the Board's quality control responsibilities was planned.

* * * * *

U. S. BERING SEA KING CRAB CATCH INCREASES:

Based on catch statistics from the Alaska Department of Fish and Game, a tabulation of the U. S. harvest of king crabs in the Bering Sea was prepared by the Department of the Interior's Bureau of Commercial Fisheries biological laboratory at Auke Bay for the International Pacific Fisheries Commission's annual report. Although modest, catches have increased steadily to a high of over 223,000 crabs in 1965. The table shows that

Annual U. S. Commercial Harvests of King Crab in Eastern Bering Sea ^{1/}		
Year	Crab No.	Average Weight Lbs.
1965	223,248	7.3
1964	122,848	8.3
1963	100,728	7.7
1962	10,346	10.0
1961	61,528	10.0
1960	87,730	7.8

^{1/}Includes catches in territorial waters (within 3 miles of shore) because these crab are undoubtedly part of the eastern Bering Sea stock.

fluctuations in average weight of crabs have occurred.



California

ABALONE OBSERVATIONS AND GROWTH STUDIES CONTINUED:

M/V "Mollusk" Cruise 65-M-3-Abalone (December 6-18, 1965): To determine the red abalone (Haliotis rufescens) population by random sampling methods for comparison with commercial harvest data, and to determine the distribution of various sizes of abalones was the purpose of this cruise by the California Department of Fish and Game research vessel Mollusk. The vessel operated in the coastal area from Point Estero to Cambria.

Thirty randomly-selected diving stations were visited. Station depths ranged from 20-66 feet. At each station a 290° transit line, 100-foot long and 15-foot wide, was covered by two divers. All removable abalones encountered were measured; if they could not be removed, size was estimated.

Big swells and tides caused turbidity which greatly restricted visibility in shallow water. At some stations, several dives were made before counts could be completed. In all, 337 abalones were observed; 79 legals (more than 7 $\frac{3}{4}$ inches); 209, 4-7 $\frac{3}{4}$ inches; and 49, smaller than 4 inches. No abalones were seen during five dives because they were at stations with sandy or barren rock bottom in water over 60 feet deep.

Actively feeding abalones were noted at several locations. As much as 50 millimeters (1.96 inches) new shell growth was recorded on some individuals. Other shellfish, including H. kamtschaticana, H. walallensis, H. assimilis, Calliostoma, Tegula and several limpet species, also showed evidence of good growing

conditions by recent shell deposits. Kelp growth was good, but some winter sloughing was occurring.

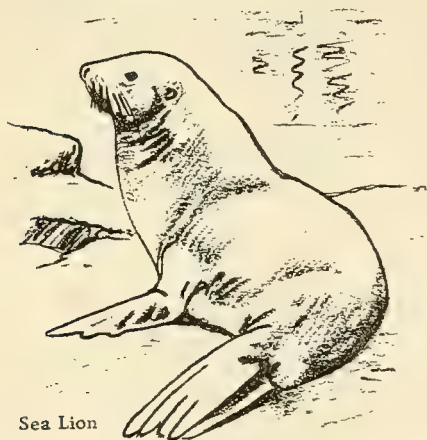
Abalone distribution by depth was fairly uniform both by size and by numbers. The northern portion of the area surveyed produced the greatest number of abalones and the most of legal size.

Note: See Commercial Fisheries Review, Feb. 1966 p. 14.

* * * * *

NOTES ON MARINE RESOURCES FOR 1965:

Population surveys during the year disclosed about 500 sea otters between Carmel Bay and Point Conception; 3,563 elephant seals, which is the highest count on record; 22,167 sea lions, and 1,063 harbor seals. Although all these resources are in good condition, protection of the sea otter will continue to receive priority attention.



Sea Lion

Preseason surveys indicate crab fishing will be good in the Eureka area but poor in the San Francisco area. Shrimp are plentiful in the Crescent City-Eureka area, promising a good year there in 1966.

During the year, 2 bluefin tuna tagged in California in 1962 were caught near Japan, bringing to 5 the number of trans-Pacific migrants tagged off California and caught off Japan. This demonstrates conclusively that fishermen on both sides of the Pacific harvest the same stock.

Shrimp were reared through 11 larval stages at the Redwood City temporary laboratory, the first time this species has been reared from the egg to the postlarval state. This study may enable identification of

shrimp in the larval stage and it is hoped will lead to more efficient techniques for sampling populations.

It is thought the heavy king salmon losses which occurred annually on Butte Creek have been eliminated. Those losses resulted from brief high flows which left many thousands of salmon stranded when the high flows subsided. A newly installed barrier has kept salmon from the upper reaches of Butte Creek and eliminated the losses. (California Department of Fish and Game, January 15, 1966.)

* * * * *

MARINE SPORT FISH SURVEY OFF SOUTHERN CALIFORNIA:

Airplane Survey Flight 65-M-3 (December 6 and December 28, 1965): Two one-day surveys were made to count poles and fishermen along the coastline. For this purpose, the southern California coastline from the Mexican Border to Jalama Beach State Park was surveyed from the air by the aircraft Cessna "182" N9042T of the California Department of Fish and Game. The counts provide data for an independent estimate of total effort and the calculation of a conversion factor to be used for estimates of effort in those areas not covered by the ground crews.

Note: See Commercial Fisheries Review, February 1966 p. 15.



Central Pacific Fisheries Investigations

TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 85 (July 23-September 7, 1965): Collection of whole blood samples from all skipjack tuna caught for subpopulation evaluation was the main objective of this cruise by the research vessel Charles H. Gilbert, operated by the Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. The area covered was the west coast of Baja California, the Gulf of California, and the Revillagigedo Islands.

Other objectives of the cruise were to collect and freeze whole blood samples for use in immunizations; obtain length and sex data from tuna sampled for blood; collect and preserve any unusual specimens and take color photographs when practical; and collect samples for electrophoretic analysis.

A total of 406 skipjack tuna and 178 yellowfin were caught during the cruise and sampled, 3 large turtles were caught and measured, and 76 bird flocks were observed.

Blood samples were obtained as planned, biological data was gathered, and the usual watch for fish, birds, and aquatic mammals maintained.

M/V "Charles H. Gilbert" Cruise 86 (October 19-26, 1965): The collection of live mackerel-like (scombrids) species for behavior studies was one of the main objectives of this cruise. The area covered was south of Oahu between Mokumanu and Brown Camp and not more than 20 miles from shore.

Other objectives of the cruise were to collect tuna specimens for density determinations; determine weight lost from small skipjack after removal of the head, viscera, and red muscle; and collect skipjack brains and eye lenses. A total of 161 skipjack and 9 little tunny were returned live to Kewalo Basin.

A standard watch for fish, birds, and aquatic mammals was maintained. Oxygen concentration of water in the transfer tanks were sampled. Troll lines were out continuously between Kewalo Basin and each fishing station. Two mahimahi (*Coryphaena hippurus*) were caught.

M/V "Charles H. Gilbert" Cruise 87 (November 9-16, 1965): Obtaining fresh samples

of surface-caught yellowfin tuna for density determinations and photographs was the main objective of this cruise. The waters within 100 miles of Oahu and Kauai were covered.

Other objectives were to collect and preserve blood samples from skipjack tuna and other scombrids and to collect and return live scombrids to behavior tanks at Kewalo Basin.

In all, 22 yellowfin tuna and 57 wavyback skipjack tuna were returned alive to the Bureau's facility at Kewalo. A total of 25 wahoo were also caught.

A standard weather watch was maintained except during fishing operations; recording thermograph was maintained while at sea; and other oceanographic observations were made.

Note: See *Commercial Fisheries Review*, Oct. 1965 p. 26.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, JANUARY-DECEMBER 1965:

Fresh and Frozen: Purchases of fresh and frozen fishery products in December 1965 for the use of the Armed Forces were down considerably in quantity and value from the previous month. Average prices for most fishery products were slightly higher.

Table 1 - Purchases of Principal Fresh and Frozen Fishery Products by Defense Personnel Support Center, December 1965 with Comparisons

Products	December				January-December	
	1965		1964		1965	1964
	Quantity	Avg. Cost	Quantity	Avg. Cost	Quantity	
	Pounds	Cents/Pound	Pounds	Cents/Pound	..... (Pounds)	
Shrimp:						
raw headless	30,350	100	33,650	98	1,150,650	1,234,200
peeled and deveined	103,200	135	104,980	134	1,953,510	1,664,304
breaded	285,300	87	385,000	87	4,973,274	4,245,770
molded and breaded	42,092	68	49,000	64	707,160	496,620
Total shrimp	460,942	97	572,630	94	8,784,594	7,640,894
Scallops	54,250	60	189,936	77	1,933,674	2,777,486
Oysters:						
Eastern	125,932	130	72,926	108	744,621	843,807
Pacific	10,100	88	22,836	77	272,814	341,914
Total oysters	136,032	127	95,762	101	1,017,435	1,185,721
Fillets:						
Cod	20,900	48	20,300	32	504,690	496,916
Flounder	101,500	37	204,000	31	2,909,600	3,062,452
Ocean perch	99,000	36	203,000	30	3,619,060	3,522,970
Haddock	53,550	38	131,752	37	1,544,455	1,898,066
Haddock portions	140,800	51	202,750	46	1,855,834	774,072
Steaks:						
Halibut	75,000	61	71,867	49	1,373,760	1,278,144
Salmon	7,240	67	11,270	68	168,640	260,825
Swordfish	200	75	2,090	70	5,030	17,261

Compared with the same month in the previous year, purchases in December 1965 were down 25.7 percent in quantity and 7.6 percent in value. The decline was due mainly to lower purchases of shrimp, scallops, fish fillets, haddock portions, and salmon and swordfish steaks.

Total purchases of fresh and frozen fishery products for 1965 were up 5.2 percent in quantity and 24.2 percent in value as compared with the previous year. Larger purchases of shrimp and haddock portions were greatly responsible for the increase in 1965.

Table 2 - Fresh and Frozen Fishery Products Purchased by Defense Subsistence Supply Centers, December 1965 with Comparisons

QUANTITY				VALUE			
Dec.		Jan.-Dec.		Dec.		Jan.-Dec.	
1965	1964	1965	1964	1965	1964	1965	1964
..... (1,000 Lbs.)				..... (\$1,000)			
1,517	2,041	27,712	26,341	1,227	1,328	18,685	15,040

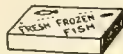
Canned: Total purchases of the three principal canned fishery products (tuna, salmon, and sardines) in 1965 were up 61.2 percent in quantity and 65.2 percent in value from those in 1964.

Table 3 - Canned Fishery Products Purchased by Defense Subsistence Supply Centers, December 1965 with Comparisons

Product	QUANTITY				VALUE			
	Dec.		Jan.-Dec.		Dec.		Jan.-Dec.	
	1965	1964	1965	1964	1965	1964	1965	1964
..... (1,000 Lbs.)				..... (\$1,000)				
Tuna ..	1/	645	8,998	5,714	1/	269	4,063	2,513
Salmon ..	3	1	4,166	2,751	2	1	2,671	1,632
Sardines ..	28	11	981	312	15	7	412	181

1/Not available.

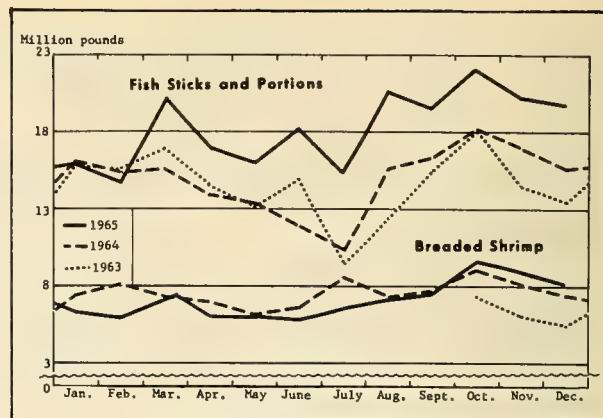
Note: Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than shown because data on local purchases are not obtainable.



Fish Sticks and Portions

U. S. PRODUCTION, OCT.-DEC. 1965:

United States production of fish sticks and fish portions amounted to 61.8 million pounds during the fourth quarter of 1965, according to preliminary data. Compared with the same quarter of 1964, this was an increase of 10.8 million pounds or 21.2 percent. Fish portions (39.0 million pounds) were up 8.1 million pounds or 25.6 percent, and fish sticks (22.8 million pounds) were up 2.9 million pounds or 14.3 percent.



U. S. production, Oct.-Dec. 1965.

Cooked fish sticks (21.3 million pounds) made up 93.3 percent of the October-December 1965 fish stick total. There were 38.2 million pounds of breaded fish portions produced, of which 28.3 million pounds were raw. Unbreaded fish portions amounted to 784,000 pounds.

Table 1 - U. S. Production of Fish Sticks by Months and Type, October-December 1965 1/

Month	Cooked	Raw	Total
..... (1,000 Lbs.)			
October	7,373	482	7,855
November	7,078	525	7,603
December	6,844	511	7,355
Total 4th Qtr. 1965 1/	21,295	1,518	22,813
Total 4th Qtr. 1964	18,653	1,308	19,961
Total 1965 1/	77,230	4,849	82,079
Total 1964	67,810	5,764	73,574

1/Preliminary.

Table 2 - U. S. Production of Fish Portions by Months and Type, October-December 1965 1/

Month	Breaded			Un-breaded	Total
	Cooked	Raw	Total		
	. . . . . (1,000 Lbs.).				
October	3,795	9,925	13,720	342	14,062
November	2,920	9,547	12,467	152	12,619
December	3,194	8,849	12,043	290	12,333
Total 4th Qtr. 1965 1/	9,909	28,321	38,230	784	39,014
Total 4th Qtr. 1964	5,643	24,652	30,295	747	31,042
Total 1965 1/ . .	30,485	106,355	136,840	2,598	139,438
Total 1964	20,956	82,816	103,772	2,541	106,313

1/Preliminary.

The Atlantic States remained the principal area in the production of both fish sticks and fish portions, with 18.3 and 24.2 million pounds, respectively. The Pacific States

ranked second with 2.3 million pounds of fish sticks, but the Gulf States ranked second in production of fish portions with 14.0 million pounds.



Florida

EDA GRANT TO PROVIDE NEW WATER LINES TO FISHERY PLANTS:

Approval of a \$19,000 grant to the City of Apalachicola, Florida, to help finance the extension of water and sewer facilities to three fishery industrial plants was announced on February 18, 1966, by the Assistant Secretary of Commerce for Economic Development.

The lines will serve the new plant of a seafood-canning company and two other small seafood-processing companies. The project will cost \$38,000 with Apalachicola matching the public works grant by the Economic Development Administration (EDA), U. S. Department of Commerce.

The seafood-canning company is ready to begin operations when the water and sewer project is completed, which should be in about four months.

Apalachicola is in Franklin County, a West Florida County which borders on the Gulf of Mexico to the south. The area has been plagued by high unemployment. The unemployment rate for 1964 was 9.5 percent. The new seafood-processing plants are part of the county's overall plan for stabilizing the economy.



Great Lakes

MICHIGAN CONSERVATION COMMISSION PROPOSES NEW REGULATION ON YELLOW PERCH AND NORTHERN PIKE FISHING:

Proposals aimed at liberalizing the catch of yellow perch and banning the take of northern pike by Great Lakes commercial fishermen were to come up for consideration along with important land matters when the Michigan Conservation Commission met February 10-11 in Lansing.

In a move to improve perch populations in the Great Lakes, the Conservation Depart-

ment was recommending removal of size limits for processed and "in the round" perch and, with one exception, an end to closed commercial seasons on those fish.

The lone exception, involving about a 50-mile stretch of Saginaw Bay and Lake Huron waters, is designed to eliminate conflicts between commercial and sport fishermen during the peak of the tourist season. It calls for a June 10-September 10 shutdown on commercial perch fishing in waters shallower than 18 feet between Point AuGres and Harrisville.

Another change recommended by the Department will, if approved by the Commission, put northern pike off limits to Michigan's Great Lakes commercial fishermen.

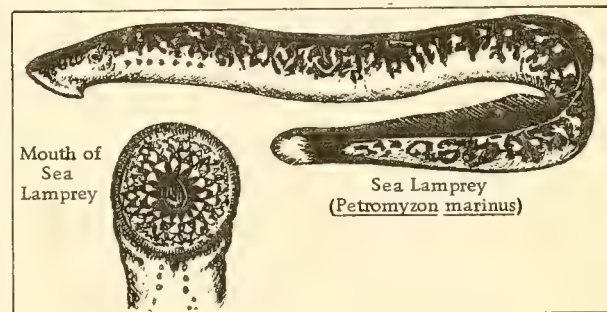
Protection of northern pike from commercial fishing is recommended because they are of major interest to anglers and of only incidental importance to commercial operators. The proposed step is in keeping with Department efforts to improve and encourage sport fishing in the Great Lakes.



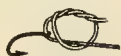
Great Lakes Fishery Investigations

SEA LAMPREY CONTROL RESEARCH, DECEMBER 1965:

Winter conditions confined field work of the Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory, Ann Arbor, Mich., during December 1965, to the operation of the all-weather screen and trap on the Big Garlic River, fyke-net fishing in the Ocqueoc River, and tagging of adult sea lampreys. A record downstream migration of recently transformed sea lampreys occurred in the Ocqueoc River. The total number reached 9,000 lampreys by December 19, 1965. A large portion of them has been retained at the Hammond Bay laboratory for use in



developing marking techniques. Seven groups of 100 have been marked using fluorescent dyes, nonfluorescent dyes, tail-clip marks, and a herring loop tag. Although the tagging of adult sea lampreys in the upper three lakes declined in December, the operation resulted in 1,669 individuals tagged to December 13. A total of 121 marked animals had been recovered to mid-December.



Great Lakes Fisheries Explorations and Gear Development

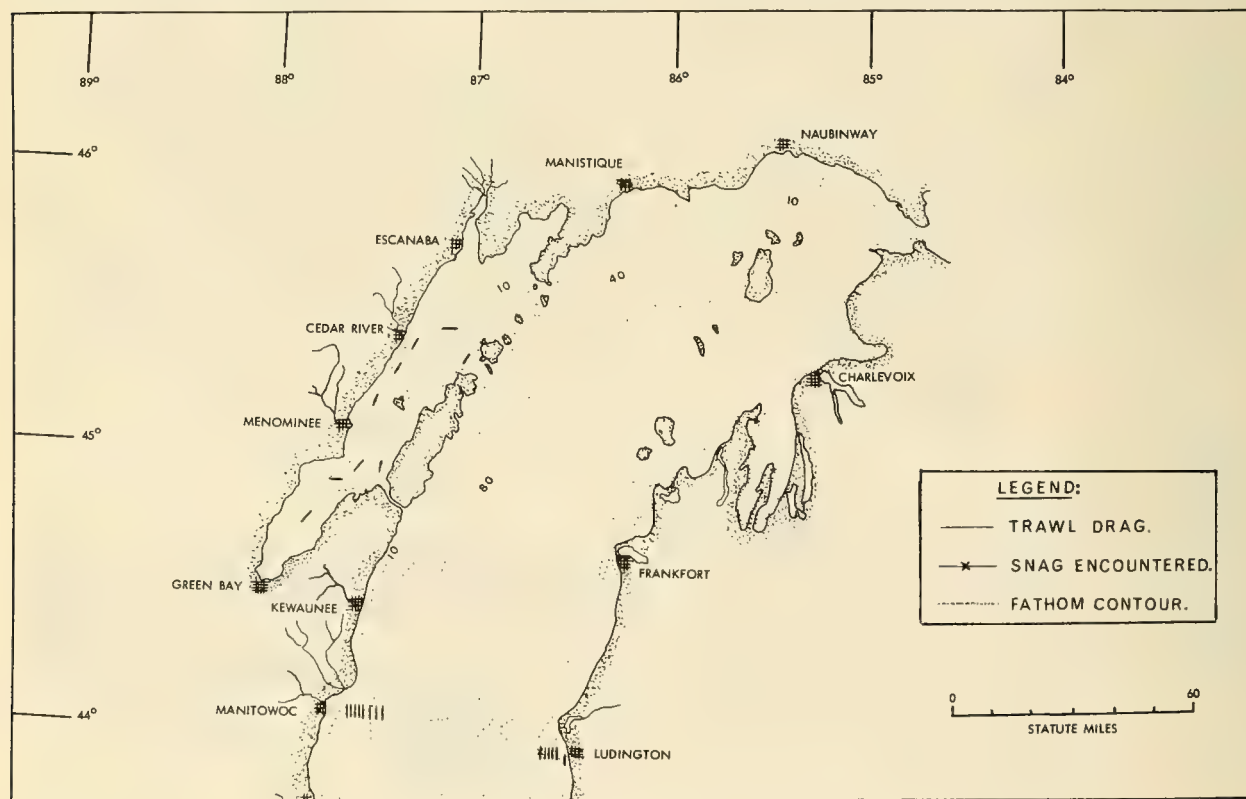
LAKE MICHIGAN TRAWLING STUDIES:

M/V "Cisco" Cruise 30 (December 1-19, 1965): A 19-day exploratory fishing cruise in Northern Lake Michigan and Green Bay was completed December 19, 1965. The primary objective was to extend knowledge regarding the seasonal and bathymetric distribution, abundance, and availability of alewife, chub, smelt, and yellow perch stocks. Other objectives were to: (1) collect fish, water and bottom samples for botulism studies, (2) obtain length-frequency data and scale

samples from chubs, alewife, and yellow perch to supplement biological studies, (3) collect plankton samples for limnological observations, (4) collect alewife, chubs, sculpins, trout perch, and shiners for food habits studies, (5) collect sculpins and smelt for technological studies, (6) collect various fish for radioactivity observations, (7) collect various fish for pesticide studies, (8) collect and preserve lake trout for rehabilitation evaluations, and (9) train personnel in trawling operations.

Commercially significant catches of alewife (up to 2,000 lbs. per half-hour drag) were caught in both Lake Michigan and in Green Bay areas. Commercially significant catches of chubs (up to 300 lbs.) were caught on both sides of Lake Michigan and significant catches of smelt were landed throughout Green Bay. A highlight of the cruise was the recovery of 9 lake trout in Lake Michigan and 4 in Green Bay. The trout, which were planted this spring, are showing a good growth rate with the largest specimen 11.1 inches long.

FISHING OPERATIONS: A total of 23 drags were completed with a 52-foot (headrope) fish



Area of operation during M/V Cisco Cruise 30 (Dec. 1-Dec. 19, 1965).

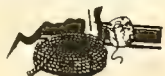
trawl, 14 in the open lake and 9 in Green Bay. All drags were 30 minutes each, except 2 which were ended early due to encounters with snags and the presence of set fishing gear. Bottom topography and vertical distribution of fish were continuously monitored and recorded with a high resolution echosounder.

FISHING RESULTS: Lake Michigan: Off Ludington commercially significant catches of alewives were landed at all depths from 10 to 30 fathoms with the best landing of 1,300 lbs. taken at 20 fathoms. A commercially significant landing of 300 lbs. of chubs in 25 minutes was made at 30 fathoms. Off Manitowoc commercially significant catches of alewives (750 and 1,000 lbs.) were made at 30 and 25 fathoms, respectively, and significant chub catches (250 to 300 lbs.) were made at 35, 40, and 45 fathoms. Catches of smelt, yellow perch, and whitefish were light off both stations. Eight of the 13 lake trout recovered during the cruise were taken off Manitowoc.

Green Bay: Alewife were gone from the shallow waters of Green Bay by December 15. The deep waters near Washington Island yielded 450 and 2,000 lbs. from 17 and 19 fathoms, respectively. Jumbo size smelt were located throughout the bay and 4 drags produced 100 to 250 lbs. Yellow perch were landed in good amounts in the southern portion of the bay. Four fin-clipped lake trout were recovered near Washington Island.

HYDROGRAPHIC DATA: Surface and fishing (bottom) temperatures were the same in Green Bay and Lake Michigan and ranged from 32° to 39° F.

Note: See Commercial Fisheries Review, Jan. 1966 p. 33.



Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, 1964-1965: Based on domestic production and imports, the United States available supply of fish meal for 1965 amounted to 500,646 short tons--173,749 tons (or 25.8 percent) less than during 1964. Domestic production was 5,272 tons (or 2.2 percent) less, and imports were 168,477 tons (or 38.4 percent) lower than in 1964. Peru continued to lead other countries with shipments of 209,801 tons.

U. S. Supply of Fish Meal and Solubles, 1964-1965		
Item	Total	
	1965	1964
. . . (Short Tons) . . .		
Fish Meal and Scrap:		
Domestic production:		
Menhaden	172,158	160,349
Tuna and mackerel	26,423	21,113
Herring	12,050	8,881
Other	19,349	44,909
Total production	229,980	235,252
Imports:		
Canada	43,830	54,769
Peru	209,801	348,025
Chile	5,651	12,942
Norway	78	-
So. Africa Rep.	5,100	18,581
Other countries	6,206	4,826
Total imports	270,666	439,143
Available fish meal supply	500,646	674,395
Fish Solubles:		
Domestic production	93,853	93,296
Imports:		
Canada	1,488	1,632
So. Africa Rep.	-	987
Other countries	3,650	1,886
Total imports	5,138	4,505
Available fish solubles supply . .	98,991	97,801

The United States supply of fish solubles during 1965 amounted to 98,991 tons--an increase of 1.2 percent as compared with 1964. Domestic production and imports of fish solubles increased 0.6 percent and 14.1 percent, respectively.

* * * * *

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production by Areas, January 1966: Preliminary data as collected by the Department of the Interior's Bureau of Commercial Fisheries:

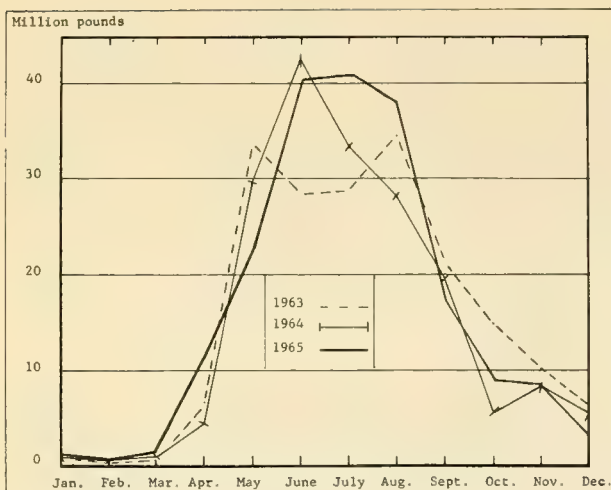
U. S. Production ^{1/} of Fish Meal, Oil, and Solubles, January 1966 (Preliminary) with Comparisons			
Area	Meal	Oil	Solubles
	Short Tons	1,000 Pounds	Short Tons
January 1966:			
East & Gulf Coasts .	1,113	247	490
West Coast ^{2/}	1,664	211	682
Total	2,777	458	1,172
January 1965 total . .	2,770	573	907

^{1/}Does not include crab meal, shrimp meal, and liver oils.

^{2/}Includes American Samoa and Puerto Rico.

* * * * *

Production, December 1965: During December 1965, a total of 9,245 tons of fish meal and 3.1 million pounds of marine-animal oil was produced in the United States. Com-



U. S. production of marine-animal oils.

U. S. Production of Fish Meal, Oil, and Solubles, December 1965¹ with Comparisons

Product	Dec.		Jan.-Dec.	
	1/1965	1964	1/1965	1964
	. . . . .(Short Tons).			
Fish Meal and Scrap:				
Herring	2/	100	12,050	8,881
Menhaden 3/.	6,483	5,047	172,158	160,349
Tuna and mackerel	1,769	1,874	26,423	21,113
Unclassified.	993	643	19,349	34,809
Total ⁴	9,245	7,664	229,980	225,152
Fish Solubles:				
Menhaden	1,373	1,693	72,948	68,738
Other	1,461	1,046	20,905	24,558
Total	2,834	2,739	93,853	93,296
	. . . . .(1,000 Pounds)			
Oil, body:				
Herring	240	93	7,767	10,354
Menhaden 3/.	2,357	5,293	172,037	157,730
Tuna and mackerel	365	218	5,458	4,816
Other (inc. whale)	105	138	5,402	7,298
Total oil	3,067	5,742	190,664	180,198

¹Preliminary data.²Included in "unclassified."³Includes a small quantity of thread herring.⁴Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

pared with December 1964 this was an increase of 1,581 tons of fish meal but a decrease of about 2.7 million pounds of marine-animal oil. Fish solubles production amounted to 2,834 tons--an increase of 95 tons as compared with December 1964.



Maine Sardines

CANNED STOCKS, JANUARY 1, 1966:

Canners' stocks of Maine sardines on January 1, 1966, were down 18,000 cases from those of the same date in 1965, and down 572,000 cases from stocks on hand 3 years ago.

The new Maine sardine canning season opened on the traditional date of April 15, 1965, and the pack to December 31, 1965, totaled 1,236,000 standard cases, as compared with the pack of 851,000 cases during the same period of 1964.

The new law legalizing year-round canning of Maine sardines, in effect for the first time in 1966, removed the traditional December 1 closing date for the packing season. The new legislation opened winter canning to all Maine sardine packers and allows winter canning with domestic as well as imported herring. None of the Maine sardine canneries have been in operation since early December due to rough seas and few fish, but several were in readiness for production.

The 1966 pack of canned Maine sardines through March 1 totaled 26,000 standard cases (100 3 $\frac{3}{4}$ -oz. cans), according to the Maine Sardine Council. This is the first January-February pack under the revised Maine law which permits year-round canning. About six plants operated during the period. Fishing has been limited due to adverse weather conditions.

Note: See Commercial Fisheries Review, February 1966 p. 23.

Canned Maine Sardines--Wholesale Distributors' and Canners' Stocks, January 1, 1966, with Comparisons¹/

Type	Unit	1965/66 Season		1964/65 Season				1963/64					
		1/1/66	11/1/65	7/1/65	6/1/65	4/1/65	1/1/65	11/1/64	7/1/64	6/1/64	4/1/64	1/1/64	11/1/63
Distributors	1,000 actual cases	267	289	194	198	236	238	291	234	254	291	261	308
Canners	1,000 std. cases ²	520	689	295	203	314	538	629	514	499	658	1,063	1,255

¹Table represents marketing season from November 1-October 31.²100 3 $\frac{3}{4}$ -oz. cans equal one standard case.

Note: Beginning with the Canned Food Report of April 1, 1963, U. S. Bureau of the Census estimates of distributors' stocks were based on a revised sample of merchant wholesalers and warehouses of retail multiunit organizations. The revised sample resulted in better coverage. The January 1, 1963, survey was conducted with both samples to provide an approximate measure of the difference in the two samples. That survey showed that the estimate of distributors' stocks of canned Maine sardines from the revised sample was 13 percent above that given by the old sample.

Source: U. S. Bureau of the Census, Canned Food Report, January 1, 1966.

North Atlantic Fisheries Investigations

DISTRIBUTION OF ZOOPLANKTON STUDIED:

M/V "Rorqual" Cruise 1-66 (January 5-February 6, 1966): To determine the inshore-offshore and vertical distribution of zooplankton with regard to hydrographic conditions in the Gulf of Maine from Cape Ann to Machias Bay were the objectives of this cruise by the Interior's Bureau of Commercial Fisheries research vessel Rorqual.

The Gulf of Maine zooplankton population was at the annual minimum. Zooplankton volumes along the coast were approximately three times lower than values obtained during the winter of 1965, but were similar to the 1964 winter coastal volumes.

Eleven invertebrate taxa were represented in the samples. Of this number, copepods were the dominant forms constituting 97 percent of the taxa collected. The most numerous copepod species was Calanus finmarchicus. Little areal differences were found in the abundance of C. finmarchicus. Of the remaining eleven copepod species in the samples, only Pseudocalanus minutus was found in significant numbers.

Herring larvae were present at four of the coastal continuity stations in the western and central Gulf coast. A total of 15 larvae were collected, ranging from 26.8 mm. to 35.2 mm. (about 1.06 to 1.37 inches) in length.

Note: See Commercial Fisheries Review, January 1966 p. 42.



North Pacific Fisheries Explorations and Gear Development

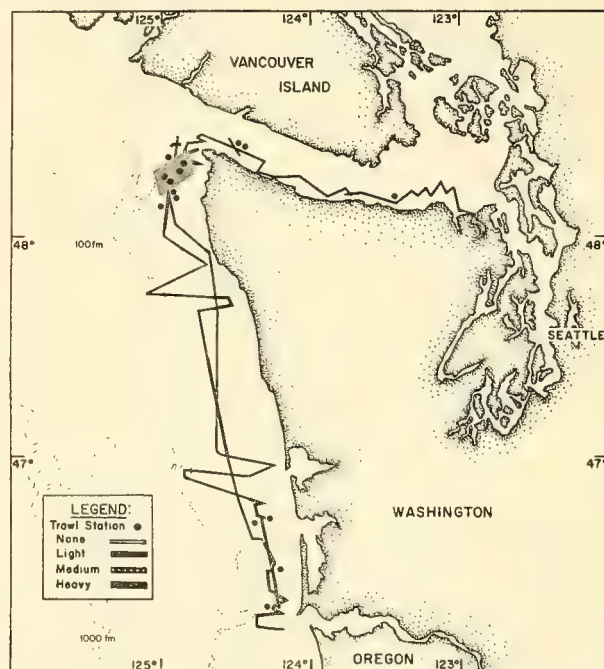
HAKE AND ANCHOVY

POPULATION SURVEY CONTINUED:

M/V "John N. Cobb," Cruise 75 (January 10-28, 1966): The primary objectives of this cruise by the Department of the Interior's Bureau of Commercial Fisheries research vessel John N. Cobb were to (1) obtain data on the geographic and bathymetric distribution of anchovies (Engraulis mordax) during the month of January; (2) determine if the $\frac{2}{3}$ -scale $\frac{3}{4}$ -inch mesh version of the Mark II "Cobb" pelagic trawl is capable of catching northern anchovies in commercial quantities; and (3) obtain biological information on north-

ern anchovy. Secondary objectives were to (1) evaluate the fishing configuration of the $\frac{2}{3}$ -scale anchovy net using SCUBA-equipped divers; (2) survey selected areas of Puget Sound for Pacific hake (Merluccius productus); (3) obtain samples of northern anchovy for proximate composition analysis by the Bureau's Seattle Technology Laboratory; and (4) obtain bathythermograph data for the U.S. Navy ASWEPS program. Area of operation was in Puget Sound, Strait of Juan de Fuca, and off Washington coast.

The following two midwater trawls were fished during this survey: (1) Standard Mark II "Cobb" pelagic trawl constructed of 3-inch mesh multifilament webbing with a 25-foot $\frac{1}{2}$ -inch liner inserted in the cod end, and (2) $\frac{2}{3}$ -scale version of the Standard Mark II "Cobb" pelagic trawl, constructed of $\frac{3}{4}$ -inch mesh multifilament webbing. Both trawls were fished with the standard two aluminum hydrofoil-type otter boards and 30-fathom bridles. A high-resolution, low-frequency echo-sounder was used to locate fish, and a dual electric depth-telemetering system, with the depth-sensing units at the ends of the bottom wings of the trawl, was used to monitor the fishing depth of the net.



Midwater trawling stations and sounding transects conducted in the Strait of Juan de Fuca and off the Washington coast during M/V John N. Cobb Cruise 75. Shading of transects depicts the relative strength of midwater echo-sounding traces.

Onshore-offshore sounding transects were made at oblique angles to shore between the 15- and 220-fathom depth contours (see chart). When fish schools were located with the sounder, they were fished to ascertain their species composition. The geographic size of anchovy schools was determined by closely spacing sounding transects in the area of the school. Length measurements were made on the major species in all hauls. A bathythermograph cast was made after each haul.

Nineteen drags, 9 with the $\frac{2}{3}$ -scale $\frac{3}{4}$ -inch mesh trawl and 10 with the Standard Mark II "Cobb" trawl, were made during the cruise. Anchovy was the dominant species taken followed by herring (*Clupea pallasii*), yellowtail rockfish (*Sebastes flavidus*), pollock (*Theragra chalcogrammus*), and dogfish (*Squalus acanthias*).

WASHINGTON COAST: Twelve hauls, 6 with the $\frac{2}{3}$ -scale $\frac{3}{4}$ -inch trawl and 6 with the Standard Mark II "Cobb" trawl, were made along the Washington coast from off Mukkaw Bay to the Columbia River mouth at depths from 16 to 88 fathoms. Anchovy was the dominant species encountered in all hauls except two, with catches ranging from a trace to 1,000 pounds. This latter haul was made with the Standard Mark II "Cobb" trawl off Grays Harbor at a depth of 23-26 fathoms over a bottom depth of 41 fathoms. The trace on the echo-sounder was light to moderate at gear depth during this haul.

Yellowtail rockfish were encountered in more than half the hauls and catches ranged up to 400 pounds in a half-hour tow made between the Columbia River mouth and Willapa Bay at 26 fathoms over 33 fathoms bottom depth. Whitebait smelt (*Allosmerus elongatus*) dominated the catches in two $\frac{1}{2}$ -hour tows made at 20-28 fathoms over a bottom depth of 30-35 fathoms; one off Willapa Bay and the other off Cape Disappointment. The largest haul (30 pounds) was composed almost entirely of juvenile smelt.

A total of more than 400 miles was scouted between Cape Flattery and the Columbia River mouth between the 13- to 220-fathom depth contours. Very little sign was encountered between Umatilla and Grays Harbor. Between the Columbia River mouth and Grays Harbor, light to moderate signs were found between the 20- and 50-fathom depth contours. Smelt, anchovy, and yellowtail rockfish were dominant in the catches made in this sign.

Between Umatilla and Tatoosh moderate to heavy sign was encountered at depths from 60-80 fathoms over a bottom depth of 60-120 fathoms. In the area southwest of Mukkaw Bay this sign was extremely heavy, and was located at an average depth of 70 fathoms over an average bottom depth of 90 fathoms. Two hauls made in this sign with the $\frac{2}{3}$ -scale $\frac{3}{4}$ -inch mesh trawl yielded predominantly anchovy, with the largest tow producing 400 pounds in one-half hour. The fish ranged from 10 to 18 cm. (3.9-7.1 inches) and averaged 14.2 cm. (5.6 in.) in length. Sounding transects showed this school to be approximately 5 miles long by 2 miles wide and from 10 to 20 fathoms in thickness. This sign was observed to rise to within 18 fathoms of the surface after sundown, at which time a one-half hour tow in this echo-sounding trace also produced predominantly anchovy (50 pounds). These fish were smaller than those taken during the day, averaging 10.6 cm. (4.17 inches) in length with a range of 9-12 cm. (3.5 to 4.7 inches). Four hours of surface nightlighting over this strong sign failed to produce any sign of anchovy at the surface.

No hake were encountered off the Washington coast during the survey.

STRAIT OF JUAN DE FUCA: More than 200 miles were echo-sounded in the Strait over depths from 15 to 140 fathoms. An intensive echo-sounding survey was made in Discovery Bay where a heavy echo trace, 10 fathoms thick, was recorded at the entrance in 41 fathoms over a bottom depth of 55 fathoms. A 25-minute tow with the $\frac{2}{3}$ -scale $\frac{3}{4}$ -inch mesh trawl caught mainly herring (250 pounds) and pollock (35 pounds). The herring ranged in size from 11 to 24 cm. (4.3 to 11.5 in.) and averaged 18.4 cm. (7.2 in.) in length. Three other tows made in the Strait on light sign did not yield any significant fish catches, although 25 pounds of a mysid (*Neomysis rayi*) were taken off Wada Island. No hake and only a trace of anchovy were encountered in these hauls.

PUGET SOUND: Four days at the beginning of the cruise and two at the end were spent in Puget Sound. Echo-sounding surveys were conducted in various localities in the Sound, especially in Saratoga Passage and Holmes Harbor in northern Sound and Case and Carr Inlets in southern Sound. Light to moderate sign was found over the central part of Saratoga Pass-

age mainly between the 25- and 50-fathom depth contours. Unfortunately winds in excess of 50 knots prevented this trace from being evaluated. In Carr and Case Inlets, moderate to heavy echo traces 3-5 fathoms thick were recorded at a depth of 35 fathoms over most of both inlets. Two 15-minute tows with the Standard Mark II "Cobb" trawl in the echo trace in Carr Inlet produced mainly herring, pollock, and dogfish with the larger tow yielding 200, 100, and 30 pounds of those species respectively. The herring ranged in size from 10 to 25 cm. (3.9 to 9.8 in.) in length, averaging 13.0 cm. (5.1 in.). Thirty-four hake, ranging in length from 14-21 cm. (5.5 to 8.3 in.) and averaging 18.2 cm. (7.2 in.) were also taken in this tow. The single 15-minute tow in Case Inlet yielded a higher percentage of dogfish (60 pounds), 30 pounds of herring, and only 5 small hake. The herring in this tow ranged from 10 to 23 cm. (3.9 to 9.0 in.), averaging 17.1 cm. (6.7 in.) in length.

A 15-minute gear trial at 70-100 fathoms over an average bottom depth of 121 fathoms off Golden Gardens produced several hake of various sizes.

GEAR EVALUATION: With the $\frac{2}{3}$ -scale $\frac{3}{4}$ -inch mesh version of the Standard Mark II "Cobb" trawl fishing at 12 fathoms, SCUBA-equipped divers dived on the net to evaluate its fishing configuration. The mouth opening was approximately 35 feet wide (measured) by 25 feet deep (estimated). These figures are not maximal as excessive amounts of "hang-in" on the crisscross rib lines prevented the trawl from operating optimally. Towing speeds recorded during actual fishing trials with this gear ranged from 2.4 to 2.9 knots at engine speeds of 260 to 330 r.p.m. (full speed), respectively. Those towing speeds are slightly greater than those experienced with the Standard Mark II "Cobb" trawl at similar engine speeds.

It is not possible to accurately evaluate the catching efficiency of the $\frac{2}{3}$ -scale $\frac{3}{4}$ -inch trawl for catching anchovy from our limited data. The largest catch was only 400 pounds of anchovy in a one-half-hour tow. This haul was less than the largest catch (1,000 pounds) made with the Standard Mark II "Cobb" trawl. But this latter haul, which was slightly less than one hour in duration, was made at sundown at full speed on a slowly ascending, moderate trace. Therefore, it is not known to what extent increased towing speed, fish

abundance, fishing after sundown, and/or other variables might have increased the catching efficiency of the trawl for anchovy.

OTHER ACTIVITIES: Samples of anchovy were retained and frozen from most hauls for proximate composition studies by the Seattle Technology Laboratory. All hake were also saved for aging by the Seattle Biological Laboratory.

A bathythermograph cast was made after each haul and ten additional casts were made for the Navy. Three bathythermograph casts and four plankton tows were taken in Saratoga Passage.

Note: See Commercial Fisheries Review, February 1966 p. 26.

Oceanography

ANTARCTIC OCEAN BIOLOGICAL STUDY:

Three marine scientists from the Institute of Marine Science, University of Miami, are participating in the first phase of a new intensive study of the Antarctic Ocean. They left Miami on January 12 for Punta Arenas, Chile, where they boarded the U. S. Coast Guard icebreaker Eastwind for the expedition into the south polar seas.

Sponsored by the National Science Foundation (NSF), the work of the scientists consists largely of collecting and studying yeasts and other fungi and phytoplankton (planktonic plants). These microscopic organisms play a vital role in the cycling of nutrients in the ocean. The Antarctic Sea is an area of great productivity. Its nutrient-rich waters support a prodigious quantity of animal life ranging from the tiny creatures of the plankton to the penguins, seals, and whales. The role of microscopic fungi in the great chain of life in the sea will be studied.

The Eastwind left Chile on January 16. After crossing the Drake Passage, the ship will stop at Palmer Station on Anvers Island, near the Antarctic Circle. One of the scientists will leave the ship there and remain at Palmer Station for five weeks making collections of terrestrial and inshore fungi. He will utilize the laboratory facilities recently set up by the U. S. Antarctic Research Program.

In the meantime, the other two scientists will collect fungi and phytoplankton from the

waters off the Palmer Peninsula, which juts out from the continent of Antarctica in the direction of South America, 700 miles away. They will be accompanied by scientists from NSF, the Smithsonian Institution, Florida State University, and the University of Hawaii, who will study deep-water corals, birds, insects, bacteria, and bottom sediments.

The cruise was scheduled to end in early March. Later that month, 2 of the scientists were to join the NSF's research vessel the USNS Eltanin for a second cruise in Antarctic waters from Chile to New Zealand.

* * * * *

MARINE SCIENTIST STUDIES ANTARCTIC OCEAN SQUID AND OCTOPOD:

A scientist of the Institute of Marine Science, University of Miami, left south Florida early in January 1966 for the frigid south polar seas. He joined the National Science Foundation's Antarctic research ship USNS Eltanin for a two-month cruise in the Drake Passage, Scotia Sea, and the waters surrounding South Georgia, South Sandwich Islands, South Orkneys, the Falkland Islands, and the Palmer Peninsula. He is the sixth scientist from the Institute to do field work in the Southern Ocean in an investigation of the occurrence, distribution, and biology of the squid and octopod in a program directed by the Institute's Division of Biological Sciences.

Supported by the Office of Antarctic Programs under the National Science Foundation, earlier Eltanin cruises with Institute scientists aboard have been from Valparaiso, Chile, to New Zealand and return, working as far south as the pack ice permitted operations. Previous cruises have been made during the Antarctic winter when the Southern Ocean is at its worst. This cruise will be the first made during the Antarctic summer.

Studies have revealed large numbers of squid and bottom-dwelling octopod in the waters surrounding the Antarctic continent and several scientific papers are now ready on various species taken on the cruises. Squid in Antarctica form a large part of the diet of the sperm whale, various seals, and numerous sea birds. With the exception of fish, they constitute the largest food source in the oceans and their study is of importance to many nations.

* * * * *

UNIVERSITY OF MIAMI'S RESEARCH VESSEL "JOHN ELLIOTT PILLSBURY" BEGINS 9-WEEK SURVEY:

A 9-week oceanographic survey of the Straits of Yucatan, the Bartlett Deep, the Brownson Deep, and the area along the coast of South America from the Guianas to the Amazon River by the research vessel John Elliott Pillsbury began on January 28, 1966. The 176-foot vessel is operated by the Institute of Marine Science, University of Miami, Miami, Fla.

Chief Scientist for the first half of the cruise (from Miami to Brazil and back to Trinidad) will be an oceanographic chemist. A total of 13 marine scientists and technicians comprised the scientific party. Temperature measurements and water samples will be taken at each of 48 different locations, or stations. Water samples will be analyzed to determine their content of oxygen, salts and trace elements. Studies will also be made of the chlorophyll content of water and of the abundance of living planktonic organisms.

After working in the Straits of Yucatan, between the western tip of Cuba and Mexico, research vessel John Elliott Pillsbury will proceed south to the coast of Honduras, then north and east to the Bartlett Deep (depth: 20,568 feet), near Jamaica; then east to the Brownson Deep (depth: 28,680 feet), off Puer to Rico. Profiles of the bottom of those great depths--the deepest spots in all the Atlantic--will be made with a precision depth recorder.

After leaving the Brownson Deep, the scientists will proceed south to Venezuela and around the northeastern coast of South America to the mouth of the Amazon River. In the Amazon basin and off Surinam, they will investigate areas of upwellings.

On this survey, for the first time, the Institute's scientists will utilize each day the computer facilities at the Institute's campus on Virginia Key, near Miami. Data from the various samples will be sent by radio to Miami and run through a computer. Within 48 hours, the scientists aboard the research vessel will have results that ordinarily would take a much longer period of time. This system will speed up the work at sea considerably.

The first half of the cruise will end at Trinidad on March 2, at which time a new group of scientists headed by a marine geolo-

gist will take over. For the next four weeks, deep-coring operations will be conducted in the Caribbean, the Bahamas, and on the Blake Plateau, east of Florida. (News of Institute of Marine Science, Miami, Fla., January 27, 1966.)

* * * * *

STUDY SHEDS NEW LIGHT ON GULF STREAM:

A study of the Gulf Stream now under way by U. S. oceanographers is shedding new light on this mysterious "ocean river." Data obtained during the first quarter of a scheduled year-long investigation, the most intensive of its kind ever attempted, are providing scientists with material upon which more definite conclusions regarding the nature of the Gulf Stream may ultimately be reached.

The undertaking, in which 15 governmental and private groups are participating, is being coordinated by the Institute for Oceanography, a component of the U. S. Department of Commerce's Environmental Science Services Administration (ESSA).

Participants include ships, planes, and scientists of ESSA's Institute for Oceanography, Coast & Geodetic Survey, and Weather Bureau; Naval Oceanographic Office; Office of Naval Research; Coast Guard; Interior Department's Bureau of Sport Fisheries and Wildlife; University of Miami; Duke University; Columbia University's Lamont Geological Observatory; University of Rhode Island; Massachusetts Institute of Technology; Woods Hole (Mass.) Oceanographic Institution; New York University; and Lerner Marine Laboratory, Bimini, Bahamas.

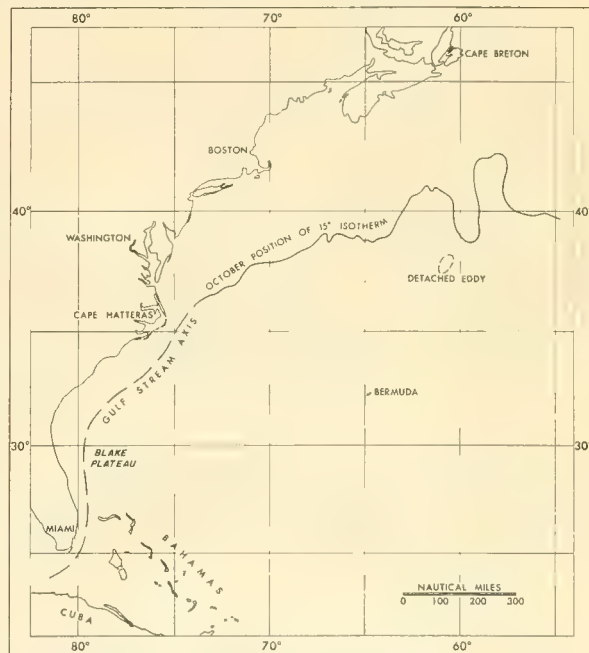
Although no formal reports have yet been made, preliminary findings disclosed the following:

1. The Gulf Stream expands and contracts like a living thing, but with an apparent irregularity that so far defies prediction.

2. The stream fluctuates like an undulating body. During the initial three-month period of the study (September through November), the position of the stream fluctuated as much as 250 miles, changing at times 15 to 20 miles a day. From September to October, a fluctuation of 200 miles was measured; from October to November, about 100 miles. The studies revealed that the stream's

course varied more and more the farther it went from the North American coast.

This extensive fluctuation was observed about 800 miles out to sea from Cape Hatteras, N.C., where the giant stream veers northeast toward Europe after flowing up the U.S. coast from the Straits of Florida.



Gulf stream position in October 1965.

3. In that area, the stream was found to migrate in northerly and southerly directions. After leaving Cape Hatteras, the stream proceeded north to about the same latitude as New York City, then veered south about 150 miles to the latitude of Washington, D. C., then north again some 210 miles to the latitude of Boston, then south once more approximately 150 miles to the latitude of Philadelphia.

4. These sharp fluctuations in the stream's course are known as meanders. The meander which fluctuated between Washington and Boston was observed in October. By November, the stream had apparently straightened out considerably, for the October meander was no longer so pronounced.

5. From time to time, part of a meander will break off, forming an eddy. The eddies remain unconnected with the stream until they disappear. One eddy 60 miles in diameter was discovered in September south of the stream (none has yet been found to the north).

It whirled counterclockwise around its 180-mile circumference at a speed of about one-third revolution per day.

6. The stream is detected most readily after it leaves Cape Hatteras at a depth of about 600 feet, where the temperature changes rapidly across the stream. The maximum surface current appears to lie above the region where the temperature at this depth is 15° C. (59° F.). Oceanographers call it the 15-degree isotherm and regard it as the main velocity axis of the stream. The 15-degree isotherm indicates the location of the "cold wall" forming the edge of the stream.

7. There is evidence that the stream extends to the bottom of the sea, even after it leaves the relatively shallow water (about 2,400 feet) over the Blake Plateau and proceeds northeastward over the deep sea. The Blake Plateau is a flat underwater shelf off the South Carolina coast.

One oceanographer theorized that the stream assumes a champagne-glass shape (minus the bottom) as it leaves the Blake Plateau. It is broader on the top and then narrows towards the bottom. He based this hypothesis on bottom current measurements and mathematical computations.

The study, which will continue into next summer, is being concentrated in these areas: Off Miami, Fla.; between the Straits of Florida and Cape Hatteras off Charleston, S. C.; and in the North Atlantic from Cape Hatteras out into the ocean to the area south of Nova Scotia.

When the study is completed, scientists will have a much better understanding of the great stream which, when it leaves the Straits of Florida, is like a mighty river discharging one hundred billion tons of water each hour. It has been calculated that the Gulf Stream flow is 22 times as large as all the rivers of the world.



Oregon

CHANGES IN FISHERY REGULATIONS CONSIDERED:

Changes in a number of regulations and clarification of others concerned with commercial trolling and shellfish (with the ex-

ception of crabs) were proposed for the February 1966 meeting of the Oregon Fish Commission.

The West Coast Trollers Association has requested a regulation hearing and has proposed an earlier opening of the chinook trolling season, at present set for April 15. The matter was to be considered at the meeting. The troll fishing area boundary at the mouth of the Columbia River and clarification of minimum size limits of commercial troll-caught coho salmon were also to be considered.

The staff has recommended action be taken to head-off potential problems that could arise from importation of uninspected seed oysters from other countries following a greatly reduced oyster "set" in Japanese waters where nearly all of the seed oysters imported to the Pacific coast have been obtained in the past.

Among the other matters scheduled for consideration was a proposal that the present 4¼-inch minimum possession limit on razor clams handled by Oregon shellfish buyers be applied only to Oregon-harvested razor clams. This would allow Oregon dealers to handle razor clams brought in from Washington where there is no minimum size restriction. (Oregon Fish Commission, February 2, 1966.)

* * * * *

WILLAMETTE FALLS FISHWAY CONSTRUCTION CONTRACT AWARDED:

Award of the contract for construction of Phase A of the long-awaited Willamette Falls fishway was made when the Oregon Fish Commission formally accepted the \$705,338 bid submitted by a Portland firm.

Phase A of the project includes construction of an 800-foot section of ladder leading from the cul-de-sac on the west side of the falls to the forebay of the dam. The cul-de-sac has long been a problem since fish bound for the upstream spawning grounds are frequently attracted into the pocket by a heavy flow of water passing through 2 plants. Although dead-ended in this cove, the fish are reluctant to leave the area to seek other means of upstream passage because of the strong water flow here. In years past, industry has been most cooperative in closing down for a period of hours each spring to eliminate this water flow attraction thus encouraging

spring chinook to leave the trap. The new fishway will eliminate the necessity of this measure and will allow free upstream passage of fish from the cul-de-sac at nearly all water stages.

Funds for the undertaking are being provided by the Department of the Interior's Bureau of Commercial Fisheries through the Columbia River Fishery Development Program, and by a Portland company in the proportion of 83.7 and 16.3 percent, respectively.

If the work proceeds as expected, the Phase A section will be ready to accommodate the spring chinook run in 1967. Later that year, fall chinook and increased numbers of coho, resulting from heavy plantings of young fish made in the system in anticipation of completion of the fishway, will return in their spawning run. Many adult coho surplus to hatchery needs also have been transplanted into the upper Willamette during the past two years in a cooperative project with the Oregon Game Commission, assisted by the Department of Interior's Fish and Wildlife Service and the Washington Department of Fisheries.

With assurance that the initial phase will soon be underway, the Commission emphasized the importance of giving attention to Phase B of the project. This includes construction of a two-entrance section which will lead from the main portion of the falls to join a common exit to the forebay with the cul-de-sac leg, replacing the present inefficient ladder. The Commission has made application to the Department of the Interior's Bureau of Commercial Fisheries for funds for Phase B work. In addition, the Governor of Oregon has requested the assistance of the State's congressional delegation in efforts to obtain Federal financial support for the project. Oregon's entire congressional delegation has indicated support of this facility. (Oregon Fish Commission, February 4, 1966.)



Oysters

EDA APPROVES PROJECT TO STUDY SEED BEDS IN CHESAPEAKE BAY:

A study to determine the feasibility of establishing commercial oyster hatcheries in the lower Chesapeake Bay area of Virginia

was approved Feb. 11, 1966, by the Assistant Secretary of Commerce for Economic Development.

Approximately \$38,050 in Federal funds for the project will come from the Economic Development Administration (EDA), U. S. Department of Commerce. In addition, an oyster company will contribute \$11,950 for a total project cost of \$50,000.

During recent years disease and pollution have reduced the natural supply of oysters available to the fishing industry in the region. As a result, widespread unemployment has developed in areas where a portion of the economy is dependent upon oyster fishing.

The EDA study will analyze the possibility of establishing artificially-seeded beds in the area, thus creating a new commercial industry that would assist in relieving unemployment among oystermen and seafood workers.

Preliminary testing of a new process for producing seed oysters was conducted in the lower Chesapeake area for five months during 1965. The EDA funds will help to continue research to determine if the new method is suitable for large-scale seed oyster production in Virginia waters.

Currently seeded oysters for the region are supplied primarily by beds in the James River. However, in the past several years such production has decreased by more than 50 percent, causing further decline of the Chesapeake area industry.



Rhode Island

FISHERMEN'S FORUM HELD:

Some 200 fishermen from New York to Maine met with experts on March 5, 1966, at the University of Rhode Island to learn about innovations and developments in the industry. The fishermen's forum was the fifth in a series that began in 1961.

An associate professor of food and resource economics at the University said the day-long program in the Memorial Union was planned in cooperation with a committee of local fishermen to provide information on such topics as aluminum fishing vessels, mid-water trawl methods, life saving equipment, and lobster-conservation programs.

Sponsored by the University of Rhode Island Marine Resources Program in cooperation with the Point Judith Fishermen's Cooperative, the Forum included several speakers and a series of question-and-answer periods. Mr. Donald L. McKernan, Director of the Department of the Interior's Bureau of Commercial Fisheries chose as his topic "The Fisherman: His Future in American Fisheries."

A marine industry marketing manager for a large aluminum and chemical corporation had as his subject "Can Trawlers be Built of Aluminum?" A staff member of the Vessel and Gear Section, Industrial Development Service, Canadian Department of Fisheries, described "The British Columbia Midwater Trawl." One of the special requests of fishermen was answered when the chief of the Search and Rescue Branch, Testing and De-

Salmon

U. S. PACIFIC COAST CANNED STOCKS, JANUARY 1, 1966:

On January 1, 1966, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 2,259,875 standard

Table 1 - Total Canners' Stocks of Pacific Canned Salmon, January 1, 1966

Species	Jan. 1, 1966	Dec. 1, 1965	Nov. 1, 1965
. (No. of Actual Cases)			
King	109,284	123,126	140,743
Red	1,801,354	1,902,932	1,983,736
Coho	173,560	193,729	232,458
Pink	651,279	767,120	793,674
Chum	263,268	305,471	328,219
Total	2,998,745	3,292,378	3,478,830

Table 2 - Total Canners' Stocks on Hand January 1, 1966 (Sold and Unsold), by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
. (Actual Cases)						
48 $\frac{1}{4}$ -lb.	5,810	226,454	64,637	4,056	66	301,023
48 $\frac{1}{2}$ -lb.	90,795	629,660	67,809	187,399	50,543	1,026,206
48 1-lb.	12,382	940,201	32,725	441,651	204,449	1,631,408
12 4-lb.	297	5,039	8,389	18,173	8,210	40,108
Total	109,284	1,801,354	173,560	651,279	263,268	2,998,745

Table 3 - Canners' Shipments from July 1, 1965, to January 1, 1966, by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
. (Actual Cases)						
48 $\frac{1}{4}$ -lb.	8,390	198,594	60,201	4,437	1	271,623
48 $\frac{1}{2}$ -lb.	78,057	353,355	64,739	224,941	43,549	764,641
48 1-lb.	8,349	520,422	75,375	607,986	294,094	1,506,226
12 4-lb.	42	4,420	5,880	39,766	8,411	58,435
Total	94,754	1,076,791	206,195	877,130	346,055	2,600,925

velopment Division, U. S. Coast Guard, discussed "New Developments in Life Saving Equipment." An associate professor of oceanography at the University discussed "What Is Good and Bad with the Present Lobster Conservation Program?" The final speaker was the executive secretary of the Congress of American Fishermen, Seattle, Washington. His subject was "What Is the Congress of American Fishermen?" (University of Rhode Island, February 11, 1966.)

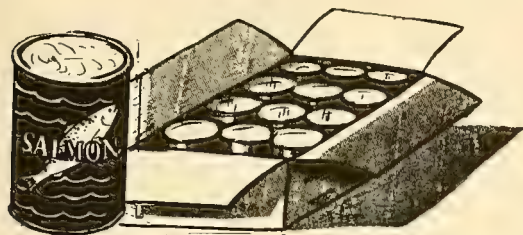


cases (48 1-lb. cans)--589,979 cases less than on January 1, 1965, when stocks totaled 2,849,854 standard cases.

On the basis of total stocks of 2,998,745 actual cases (consisting of cans of $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., 1-lb., etc.), red salmon accounted for 1,801,354 cases (mostly 1-lb. and $\frac{1}{2}$ -lb. cans) or 60.1 percent of the total canners' stocks on January 1, 1966; pink salmon accounted for 651,279 cases or only 21.7 percent (441,651 cases were 1-lb. talls). Next came chum (263,268 cases, mostly 1-lb. talls), followed by coho or silver (173,560 cases), and king salmon (109,284 cases).

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965,

the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.



Shipments at the canners' level of all salmon species from July 1 to January 1, 1966, totaled 2,014,887 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses): king, 95,503 standard cases (78,155); red, 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners who packed over 95 percent of the 1965 salmon pack. (Division of Statistics and Economics, National Canners Association, February 4, 1966.)

Note: See Commercial Fisheries Review, February 1966 p. 35.



Shellfish

NATIONAL CONFERENCE ON DEPURATION:

A National Conference on Depuration of Shellfish will be held on the campus of the University of Rhode Island, July 19-22, 1966. This conference is sponsored by the Shellfish Sanitation Branch, Public Health Service, with the cooperation of the University of Rhode Island. The purpose is to assemble and exchange current expert knowledge of all

aspects of the subject. Subsequently, the information obtained and discussed will be published. All who are interested are welcome to attend. For advance reservations and further information, contact Dr. Carl N. Shuster, Director, Northeast Shellfish Sanitation Research Center, U. S. Public Health Service, DHEW, South Ferry Road, Narragansett, Rhode Island, 02882.



Shrimp

MORE SHRIMP EATEN BY AMERICANS:

Americans are eating more shrimp than ever before, reports the Department of the Interior's Bureau of Commercial Fisheries. Total consumption in 1965 is estimated at 323 million pounds, compared with 299 million pounds in 1964.



On a per capita basis, the Bureau reports, Americans are eating about 75 percent more shrimp than in the years immediately following World War II.

The Bureau says there appears to be no single answer to why Americans are consuming more shrimp, but rising purchasing power, growing consumer preference, development of new products, wider distribution, improvement in quality, and increased product promotion have all been contributing factors.

The domestic shrimp industry is primarily in the Gulf States. The United States also imports large quantities of shrimp. Mexico and other Latin American countries, along with India, have been supplying increasing quantities in recent years.

* * * * *

BREADED PRODUCTION, OCTOBER-DECEMBER 1965:

United States production of breaded shrimp during the fourth quarter of 1965 amounted to about 26.5 million pounds--an increase of about 1.8 million pounds or 7.4 percent as compared with the same period in 1964.



Breaded shrimp on conveyor belt moving to weighing and packing line

Table 1 - U. S. Production of Breaded Shrimp by Areas, October-December 1965

Area	Oct.-Dec. 1965 ^{1/}		Oct.-Dec. 1964	
	Number Plants	Quantity 1,000 Lbs.	Number Plants	Quantity 1,000 Lbs.
Atlantic & Gulf	42	24,544	34	23,096
Pacific	7	1,938	8	1,551
Total	49	26,482	42	24,647
^{1/} Preliminary.				

Table 2-U. S. Production of Breaded Shrimp by Months, 1964-65

Month	1/1965	1964
	. . (1,000 Lbs.). .	
January	7,442	7,401
February	7,117	8,100
March	8,251	7,303
April	7,366	7,081
May	7,304	6,224
June	7,371	6,641
July	7,401	8,697
August	9,040	7,354
September	9,302	7,885
October	9,475	9,225
November	8,957	7,907
December	8,050	7,515
Total	97,076	91,333
^{1/} Preliminary.		

The Atlantic and Gulf States ranked first in the production of breaded shrimp with 24.5 million pounds, followed by the Pacific States with 1.9 million pounds.



South Atlantic Fisheries

Explorations and Gear Development

ABUNDANCE AND DISTRIBUTION OF BROWN AND PINK SHRIMP OFF FLORIDA COAST STUDIED:

M/V "Oregon" Cruise 106 (January-January 21, 1966): Assessment of the current abundance and distribution of large brown and pink shrimp south of Cape Kennedy, located during explorations in January 1965, was the primary objective of this cruise by the U. S. Bureau of Commercial Fisheries exploratory fishing vessel Oregon. For areas explored, see map on page 39.

SHRIMP: Sixty 1- to 2-hour drags were made with 40- and 65-foot flat trawls fished on 6- and 8-foot chain doors in depths ranging from 8 to 38 fathoms. Only scattered individual brown and pink shrimp (26-30 and 31-36 heads-off count, respectively) were caught in areas where commercial concentrations were located one year ago. Rock shrimp (*Sicyonia brevirostris*) were taken in catches of up to 60 pounds per 1-hour drag in 26 to 27 fathoms at 28°07' N. latitude and 80°03' W. longitude. Catches of 21-25 heads-off count white shrimp inside the 15-fathom curve ranged up to 48 pounds per 2-hour drag.

FOOD FISH: Fish catches in the area ranged from 0 to 1,900 pounds per hour drag. The largest catches of individual species were: spots (*Leiostomus xanthurus*)--1,800 lbs. (avg. 4 lbs.), croakers (*Micropogon undulatus*)--231 lbs. (avg. 5 lbs.), black sea bass (*Centropristes striatus*)--87 lbs. (avg. 3 lbs.), and flounder (*Paralichthys dentatus*)--32 lbs. (avg. 1½ lb. each).

Note: See *Commercial Fisheries Review*, January 1965 p. 36.

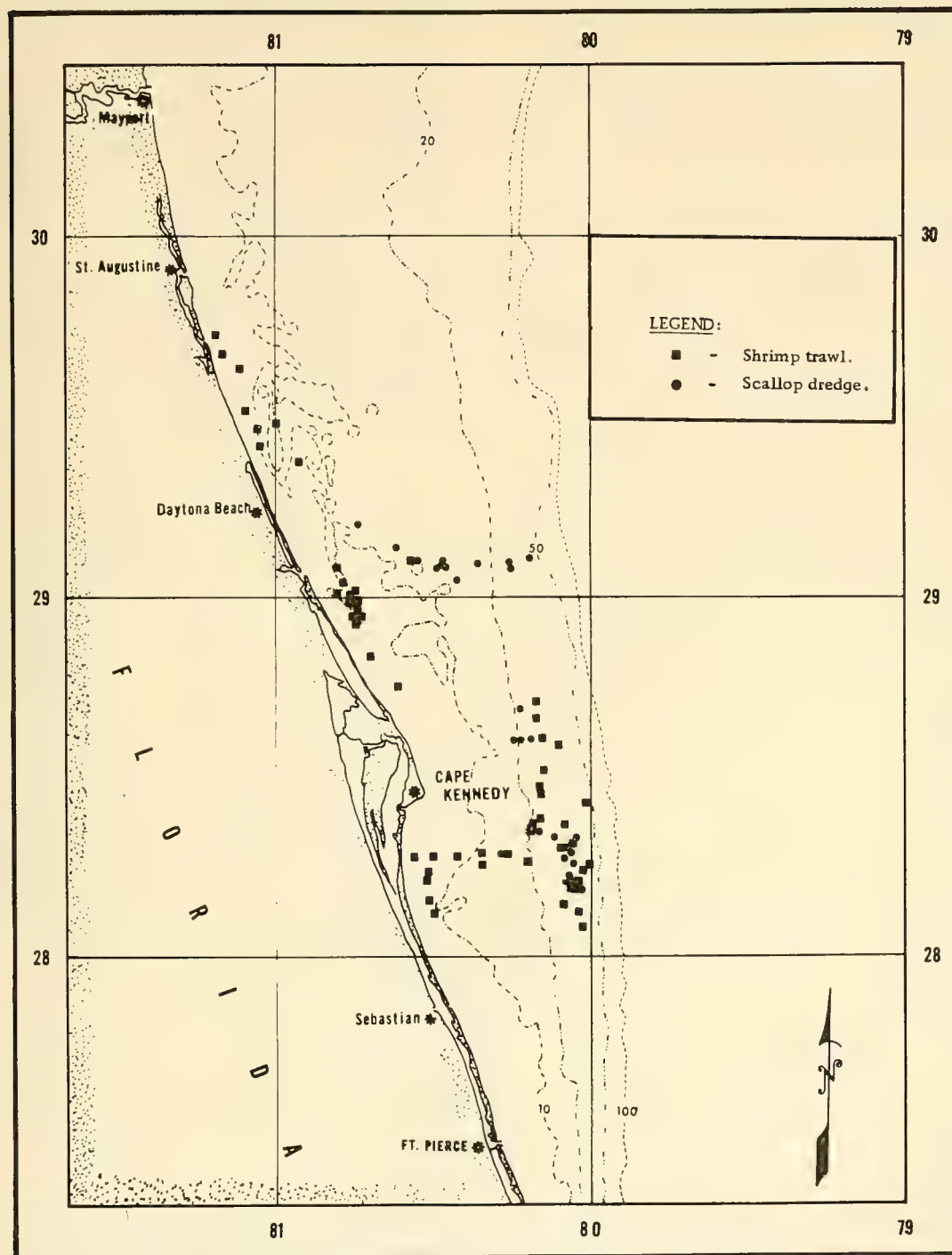


Tropical Atlantic Fisheries

Investigations

LIVE BAIT DISTRIBUTION AND TUNA STUDIES:

M/V "Geronimo" Cruise 5 (July 21-November 4, 1965): To investigate the distribution and biology of (1) fish suitable for use as live bait for tuna fishing and (2) surface tunas and other pelagic predators (together with measurements of the physical and biological environment) were the main purposes of this cruise



Areas explored by M/V Oregon Cruise 106 (January 12-21, 1966).

by the Department of the Interior's Bureau of Commercial Fisheries research vessel Geronimo operated by the Tropical Atlantic Biological Laboratory. The areas of operation were the Western Atlantic Ocean adjacent to Lesser Antilles and the Caribbean Sea.

In Puerto Rican waters, bait fish were observed and sampled at Mayaguez Harbor and Aquadilla Bay--thread herring, mixed with Spanish sardines (Sardinella).

Bait fish were observed, in potentially useful quantities, at Forte de France Harbor,



M/V Geronimo Cruise 6 area of operations in Western Atlantic Ocean, Lesser Antilles, and the Caribbean Sea (July 21-November 4, 1965).

BAIT FISH: Bait fish were observed in moderate to abundant quantities in numerous areas along the Carolina, Georgia, and east Florida coast. Large quantities were observed off the Florida west coast between Cape Romano and Fort Myers Beach in the 4- to 5-fathom depth range. Thread herring (Opisthonema) appeared to be the most abundant species in these locations, except for Pensacola herring (Harengula) at Miami Beach.

Martinique, Cannouan Island in the Lesser Antilles, and near the U. S. Naval Station, Port of Spain, Trinidad. Spanish sardines were taken near the Gulf of Cariaco, Venezuela. Particular locations here at which sardines and anchovies are harvested commercially are at Pt. Araya, Isla Lobos, and Picuda Island.

Abundant bait was found on the northwest coast of Aruba; along the Colombian coast,

particularly at Cape La Vela; off Black River, Jamaica; and in the Gulf of Honduras. Strong prevailing winds hampered much of the baiting operations, but conditions were good at Cape La Vela, Black River, and in the Gulf of Honduras. The most common bait species was the thread herring, but at most baiting stations, the Spanish sardine and the deep-bodied herrings of the genus Harengula also occurred, along with some anchovies.

From these observations, one can infer that small fish, suitable for live-bait fishing, are available in reasonable quantities throughout much of the southeastern United States and Caribbean coastal waters in the July-November season. Future sampling and use of these fish on other surveys will yield information as to the suitability of the several species as chum.

During the cruise it was observed that thread herring held up well in the bait tank, and when thrown as chum tended to swim towards the vessel (a behavioral trait useful in attracting tuna to the vessel). The thread herring from Colombia survived from the time of capture (September 28) through the remainder of the cruise (November 4). The large (6-8 inch) Spanish sardines (Sardinella) obtained in Venezuela died off rapidly, lasting only $2\frac{1}{2}$ -3 days.

DISTRIBUTION AND BIOLOGY OF SURFACE TUNAS: A total of 44 fish schools was observed during the cruise. From these, 48 tuna were sampled (6 E. alletteratus; 14 T. albacares; 15 K. pelamis; 13 T. atlanticus). Throughout most of the cruise, few surface schools containing commercial quantities of tunas were observed. Notable exceptions were the following:

While running through the Bahamas Islands area (New Providence Channel) on the night of July 30, the ship passed through a large concentration of bluefin tuna (Thunnus thynnus) of 50- to 150-lb. size. These fish were observed along the vessel's course for over $2\frac{1}{2}$ hours.

At 12° N. and 65° W., an area of commercial concentrations of yellowfin (Thunnus albacares) and skipjack (Katsuwonis pelamis) tuna was encountered. These fish were in compact schools and were in a feeding frenzy. The yellowfin ranged in size from 15-30 lbs.; the skipjack, 3-6 lbs. It was estimated that there were about 80-100 tons of fish in the

area, and these could have been captured by a tuna seiner.

A small school (1 to 2 tons) of skipjack and blackfin tuna (Thunnus atlanticus) was sighted between Serrana and Serranilla Banks and was sampled by trolling. Individuals of both species weighed from 4-8 lbs.

Numerous small schools of little tuna (Euthynnus alletteratus) mixed with blackfin tuna were observed in the Gulf of Honduras. These occurred around small coral outcroppings which came to within about 4 fathoms of the surface. Preliminary analysis of temperature data from the Gulf indicates that upwelling was occurring. The waters of the entire area appeared to be highly productive.

ENVIRONMENT SURVEY: Extensive biological and oceanographic observations were made throughout the cruise. Routine observations included oceanographic casts to depths of 500 or 1,000 meters, tow-net sampling with 1-meter, 2-meter, neuston, and enlarged Clark-Bumpus nets, night lighting, primary productivity, bathymetric, bathythermometric, and meteorological observations.

Note: See Commercial Fisheries Review, October 1965 p. 54.



United States Fisheries

EX-VESEL VALUE OF CATCH SETS RECORD IN 1965:

The ex-vessel value of United States fishery products in 1965 reached a record high of about \$440 million, up \$51 million or 13 percent over 1964, Secretary of the Interior Stewart L. Udall announced. The 1965 record is also 11 percent above the previous record of \$396 million in 1962.

The Director of the Interior's Bureau of Commercial Fisheries, informed the Secretary that the 1965 increase in value reflects a significant gain in demand for quality fish and fish products. The American consumer recognizes that fish is a relatively low-cost, high-protein food with little waste. The 1965 record reflects the continuing desirability of fishery products, adding that improvements in processing, packaging, freezing, and transportation all played parts in creating the record year.

For individual commodities, the shrimp industry led the parade of new records. The



Heading shrimp aboard a fishing vessel.

value of the United States shrimp catch in 1965 was estimated at \$82.6 million, up 17 percent from 1964 and 8 percent above the previous record value of \$70.4 million in 1953. Other fisheries that set new records in 1965 were northern lobsters, sea scallops, yellowtail flounder, haddock, Pacific halibut, and Alaska salmon.



U. S. Fishing Vessels

DOCUMENTATIONS ISSUED AND CANCELLED, OCTOBER 1965:

During October 1965, a total of 54 vessels of 5 net tons and over was issued first docu-

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, October 1965 with Comparisons				
Area (Home Port)	Oct.		Jan.-Oct.	
	1965	1964	1965	1964
	. . . . (Number).			
<u>Issued first documents 2/:</u>				
New England	2	3	32	29
Middle Atlantic	4	1	13	9
Chesapeake	4	9	38	36
South Atlantic	8	3	60	39
Gulf	27	11	253	194
Pacific	8	7	157	130
Great Lakes	1	1	2	2
Hawaii	-	-	-	1
Puerto Rico	-	1	1	2
Total	54	36	556	442
<u>Removed from documentation 3/:</u>				
New England	-	7	27	42
Middle Atlantic	2	5	17	24
Chesapeake	2	4	29	28
South Atlantic	10	12	74	49
Gulf	7	6	106	82
Pacific	9	5	80	127

(Table continued in next column.)

U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, October 1965 with Comparisons (Contd.)

Area (Home Port)	Oct.		Jan.-Oct.	
	1965	1964	1965	1964
	. . . . (Number).			
Great Lakes	-	-	19	12
Hawaii	-	-	2	-
Puerto Rico	-	-	1	-
Total	30	39	355	364
1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.				
2/There was 1 redocumented vessel in October 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 38 in 1965; 1 in 1960; 1 in 1954; 2 in 1951; 10 prior to 1949; and 2 unknown.				
3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.				
Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.				

ments as fishing craft as compared with 36 in October 1964. There were 30 documents cancelled for fishing vessels in October 1965 as compared with 39 in October 1964.



U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-29, 1966, amounted to 5,629,133 pounds (about 268,054 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 59 percent from the 3,540,035 pounds (about 168,573 standard cases) imported during January 1-30, 1965.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1966 at the 12½-percent rate of duty has not been announced; however, in 1965 the quota was 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota were dutiable at 25 percent ad valorem, but total imports were below the quota in 1965.



Virginia

INDUSTRIAL FISH INVESTIGATIONS COMMENCED:

Scientists at the Virginia Institute of Marine Science are undertaking a fishery research project that may add a new dimension to commercial fishing in Virginia, and to the associated fishery industries based there, according to its Director.

The project concerns use of industrial fish, species ordinarily discarded in food-fish catches but which can be processed into high-protein meal or flour for domestic consumption.

According to the head of finfish research at the Institute and director of the industrial fish project, an estimated three-fourths of the species available in Chesapeake Bay and along the mid-Atlantic region of the continental shelf are among those which fishermen now discard.

Seventy five percent of the funds for the 3-year project will come from the Federal Government under the Commercial Fisheries Research and Development Act, Public Law 88-309, which provides up to 3 to 1 matching funds to states for worthwhile fishery research.

"If adequate state support is provided to match the Federal funds already approved, the program will continue for three years or longer," reported the director of the laboratory. "This long-range aspect will assure the accuracy of our data, upon which fishermen and manufacturers may consider large investments to develop what now appears an exciting economic potential."

The program's first expedition went to sea recently. Aboard the 90-ft. trawler Seabreeze, chartered from its Hampton, Virginia, owners for a month, were four Institute scientific personnel. They sampled for industrial fish along the continental shelf from Cape May to Cape Hatteras.

The marine biologists are primarily interested in two species of sea robins, three species of hakes, spiny dogfish, and other kinds of sharks and rays. Trawl samples will be made at 46 stations charted along the shelf in waters ranging from 30 to 100 fathoms. Sixty additional stations will be worked if time and weather permit.

The program's primary objective is to determine if species not now being taken occur in sufficient quantities to support an industrial fishery.

"We expect to sample the quantities and distribution of these fish in each season of the year," said the biologists. "When we have reached a certain stage in the program, manufacturers interested in developing the industry will have an idea of its potential."

Information gathered from the program may indicate that a new industry can be formed in Virginia, and close proximity to the raw product will favor its development.

Trawl fishermen already engaged in the seafood industry along Virginia's shores could receive additional income from this industry as it develops. They may return to port fully loaded with industrial species during seasons when food fishes are in short supply.

The month-long expedition will remain at sea for seven days each cruise, with two days in port for resupply and unloading of samples collected. The project now underway will ascertain the suitability of unused species to the industrial fishery, and it will determine the magnitude of supply and of sustained catch.



Washington

WIND RIVER CHINOOK SALMON FISHWAY IMPROVED:

The Engineering and Construction division of the Washington Department of Fisheries has completed improvements in the large fishway on the Wind River that bypasses Shipperd Falls on that Columbia tributary in Skamania County.

The improvements were installed to aid the escapement of fall chinook salmon past the falls. The run of chinook above the falls dates from 1955 and during the past few years substantial numbers of chinook have escaped to spawn in the upper river.

The fishway improvements include water intakes, piping and jet outlets to make the fishway more efficient and attractive to fall chinook salmon. A series of five surface and subsurface jet outlets were installed at the fish entrance. The increased water flow is continued in the first 3 bays of the fishway by water jets in diminishing proportions to lead the fish securely into the ladder. The water supply for these salmon attractions is brought through the fishway in a 30-inch pipe by siphon from an intake box near the upper end of the fishway.

The fishway was built in 1955 in an attempt to open up the stream for fall chinook utilization and to create an annual run. Since that time substantial numbers of fall chinook,

spring chinook, and coho or silver salmon have used the facility to reach the spawning grounds. Fall chinook escapements have totaled 4,173 in 1962; 1,916 in 1963; 2,391 in 1964; and 2,300 in 1965.

The returning salmon are adults from releases of young salmon in the river from the Federally operated Carson National salmon hatchery upstream from the fishway.

During the past two years, observation of the fishway had revealed that many adult fall chinook bypassed the entrance of the fishway and were trapped in the series of falls about half way up the ladder. To make the entrance of the fishway more attractive to salmon and to prevent their being trapped in the falls area, Washington Department of Fisheries engineers, working with biologists, designed the water jets to increase the flow at the entrance. Salmon are attracted by a vigorous horizontal current as well as an obvious flow of water. The jet outlets, placed just within and in front of the entrance, gives a strong flow at all water levels and by increasing the flow inside the first 3 bays in a diminishing proportion, it is believed that salmon entering the ladder will stay in it and completely bypass the falls.

In addition to the fishway improvements, some flood damage repair work was done down stream from the fishway entrance to make it easier for salmon to reach the entrance.

The fishway improvements were accomplished by the use of Federal funds, at a total cost of around \$80,000. (State of Washington Department of Fisheries, December 17, 1965.)



Wholesale Prices

EDIBLE FISH AND SHELLFISH, FEBRUARY 1966:

The February 1966 wholesale price index for edible fish and shellfish (fresh, frozen, and canned) was at 123.2 percent of the 1957-59 average, a drop of only one percent from the previous month but 12.3 percent above February 1965. In spite of the small overall decrease from January, there was a mixed trend in the individual products with some sharp increases and decreases.

February 1966 prices for all items in the drawn, dressed, or whole finfish subgroup were down 10.6 percent from January due principally to a 41.7 percent drop in large fresh haddock prices at Boston. The haddock landings at that port increased sharply in February. There was practically no change in prices for halibut and salmon at New York City, while there were sharp increases in prices for the fresh-water items--whitefish at Chicago (up 15.9 percent) and yellow pike at New York (up 13.3 percent). The February index for this subgroup was 9.1 percent higher than the previous year.



Shucking oysters in a New Orleans oyster-shucking plant.

Fresh processed fish and shellfish prices were up slightly as an increase in prices for shucked oysters more than offset declines in prices for haddock fillets and fresh shrimp. However, the February index was 13.4 percent above the February 1965 index.

Prices for frozen flounder fillets and shrimp were up in February 1966, while prices for fillets of haddock and ocean perch were unchanged from January. The subgroup index for frozen processed fish and shellfish was 3.7 percent above the previous month and 6.8 percent higher than the previous year.

The only change in canned fish prices during February was an increase in pink salmon prices at Seattle. Tuna, mackerel, and Maine sardine prices were all unchanged from the

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, February 1966 with Comparisons								
Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			Feb. 1966	Jan. 1966	Feb. 1966	Jan. 1966	Dec. 1965	Feb. 1965
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					123.2	124.5	119.3	109.7
<u>Fresh & Frozen Fishery Products:</u>					124.9	127.7	120.6	114.5
<u>Drawn, Dressed, or Whole Finfish:</u>					123.7	138.3	123.4	115.1
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.14	.24	111.3	187.4	119.6	99.2
Halibut, West, 20/80 lbs., drsd., fresh or froz.	New York	lb.	.47	.48	139.0	141.0	141.0	117.3
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.88	.88	122.3	122.3	122.3	113.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.73	.63	108.2	93.3	93.3	96.3
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.85	.75	139.1	122.3	116.2	131.0
<u>Processed, Fresh (Fish & Shellfish):</u>					130.5	128.3	123.5	115.1
Fillets, haddock, sml., skins on, 20-lb. tins	Boston	lb.	.45	.44	109.3	105.7	105.7	105.6
Shrimp, lge. (26-30 count), headless, fresh	New York	lb.	1.05	.99	123.0	116.0	106.6	113.7
Oysters, shucked, standards	Norfolk	gal.	8.50	8.75	143.3	147.6	147.6	118.0
<u>Processed, Frozen (Fish & Shellfish):</u>					116.0	111.9	110.6	108.6
Fillets, Flounder, skinless, 1-lb. pkg.	Boston	lb.	.42	.40	106.4	101.4	101.4	88.7
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.40	.40	117.3	115.8	115.8	114.3
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	112.2	112.2	112.2	108.7
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	.98	.93	115.6	110.3	107.9	107.9
<u>Canned Fishery Products:</u>					120.7	119.3	117.5	101.8
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs.	Seattle	cs.	28.50	28.00	124.2	122.0	119.8	91.5
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	12.63	12.50	112.1	111.0	108.8	102.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.13	7.13	120.9	120.9	120.9	105.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	128.3

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

previous month, and the overall index for the subgroup was up 1.2 percent. Compared with February 1965, all canned fishery products

prices were much higher and the subgroup index was up 18.6 percent.



MOST ABUNDANT FISH ISN'T EATEN

Paradoxically, the most abundant fish along the Atlantic and Gulf Coasts never graces the dinner table. Menhaden, a boney fish too oily to eat, accounts for about 40 percent of the total catch of commercial fish and is the principal source in the United States for marine oils used as drying agents in paints and varnishes. The fish meal produced along with fish oils from menhaden is widely used in livestock and poultry feeds, and as a fertilizer.



International

FOREIGN FISHING OFF U. S. COASTS

SOVIET AND JAPANESE ACTIVITY, FEBRUARY 1966:

Alaska: U.S.S.R.: In mid-February 1966, a total of 145 Soviet vessels were fishing in the North Pacific Ocean, the Bering Sea, and the Gulf of Alaska.

A major Soviet Pacific ocean perch fleet of about 85 vessels fished in the eastern Gulf of Alaska. The vessels were deployed along the edge of the Continental Shelf from the Canadian border at Dixon Entrance to Middleton Island west of Cape St. Elias.

A small Soviet ocean perch fleet of about 20 vessels (some of which are large BMRT factory stern trawlers) was operating in the western Gulf of Alaska. The fleet was located along the 100-fathom curve in the vicinity south of Chirikof Island.

The Soviet shrimp fishery in the Gulf of Alaska consisted of two small fleets, each involving about five medium refrigerated trawlers (SRT-M class). One fleet was fishing east of the Shumagin Islands; the second was in the area between Chirikof and the Trinity Islands south of Kodiak Island. The Soviet 1966 catch quota for Bering Sea shrimp was set at 6,000 metric tons (13.2 million pounds).

On January 28, 1966, a U. S. Coast Guard plane sighted three Soviet vessels one-half mile inside U. S. territorial waters off Alaska. They were the large freezer stern trawlers Basargin (BMRT-343) and Khingian (BMRT-488), and the processing mothership Sovetskaiia Kamchatka. Their position was 54°54' N. and 133°12' W., near Cordova Bay, Prince of Wales Island in Southern Central Alaska. All three vessels were underway and subsequent investigation disclosed that they left U. S. territorial waters. No action was taken by the Coast Guard or other U. S. authorities

as it was believed that the Soviets had entered U. S. waters inadvertently.

JAPAN: Four factory stern trawlers were reportedly fishing on Albatross Bank in the western Gulf of Alaska east of the Trinity Islands. It was believed the vessels were fishing for Pacific ocean perch.

One factory stern trawler was reported fishing for ocean perch in the eastern Aleutians south of Unalaska Island.

Two factory stern trawlers were fishing in the Bering Sea north of Unalaska Island, predominantly for Pacific ocean perch.

A factoryship and 6 trawlers continued to operate in the Bering Sea along the eastern Aleutian Islands, taking mainly Alaska pollock (used for minced fish meat and reduction into fish meal and oil).

The vessels were joined by a second factoryship accompanied by 11 trawlers. According to Japanese press reports, that fleet was fishing primarily for Pacific ocean perch.

Northwest Pacific Coasts: U.S.S.R.: The Soviet fishing fleet that normally operates in the Gulf of Alaska moved massively south as far as Vancouver Island, British Columbia. By mid-February, almost 100 Soviet vessels (mostly medium side trawlers and large stern trawlers supported by refrigerated fish carriers) fished on the west side of Vancouver Island from Dixon Entrance to Queen Charlotte Sound. It seems that Soviet exploratory vessels which have been working off and on off the British Columbia's coast discovered large concentrations of ocean perch.

For a short while two Soviet large stern trawlers (Kazakhstan--BMRT-387 and Severomorski Komsomolets--BMRT-429) and a medium side trawler (SRTM--8410) fished 20-50 miles west of Cape Flattery, Wash. By mid-February, however, they had rejoined

International (Contd.):

the main Soviet fishing fleet off British Columbia.

A solitary Soviet refrigerated transport reported off Californian coast in mid-February 1966 was on a return journey to her home port of Vladivostok with frozen whale meat from the Soviet Antarctic Expedition.

Northwest Atlantic: U.S.S.R.: A total of 72 Soviet fishing vessels were sighted off the North Atlantic coast in mid-February 1966 of which 66 were identified as 36 factory stern trawlers, 4 processing and refrigerated freezer trawlers, 19 medium trawlers, 3 refrigerated transports, one processing and refrigerated factory base ship, one tanker, one tug and one hydrographic research vessel.

Of the 36 large factory stern trawlers, 7 fished southern Georges Bank. Heavy catches, (some trawls contained an estimated 30,000 to 40,000 pounds of fish) appeared to be mostly haddock mixed with small amounts of whiting.

The remaining Soviet vessels were concentrated in two large groups. The first, consisting of about 35 vessels, located 30-40 miles SSE of Nantucket Island, was fishing mainly for whiting with incidental catches of red hake. The second group of fishing vessels, consisting of about 30 vessels and operating 60 miles SSE of Block Island, also fished for whiting and red hake.

The U.S.S.R. hydrographic research vessel sighted does not normally operate with the fishing fleet as it does research for the Soviet Navy. However, it did refuel from a tanker operating with the fishing fleet.

In order to observe foreign fishing activity in the North Atlantic, the staff of the Fisheries Resource Management Office, Department of the Interior's Bureau of Commercial Fisheries, Gloucester, Mass., has been conducting reconnaissance flights cooperatively with the U. S. Coast Guard.

On January 20, 1966, a Soviet trawler (the Perekop, RT-221) requested permission from the U. S. Coast Guard to enter U. S. territorial waters for emergency repairs. The Perekop (with a cable fouled in the propeller of the vessel) was towed near Provincetown, Mass., by a Soviet salvage tug (the Steregushchii). A boarding party consisting

of U. S. Coast Guard, Navy, Customs, and Bureau of Commercial Fisheries personnel went aboard. The boarding party had no interpreter.

Gulf of Mexico and Caribbean: JAPAN: It is thought that the Japanese are long-lining for tuna in this area. It is believed that approximately 20 vessels are so engaged delivering fish to St. Martin, Netherlands Antilles.

U.S.S.R.: In an article published in the St. Petersburg Times, Congressman Paul Rogers of Florida reported on his discussions with Soviet fishery scientists during his visit to the Soviet Union. The Soviets "admitted that they have an ocean research vessel operating in the Gulf of Mexico. The vessel shows Cuban fishing fleets where to fish."

According to a December 1965 article in World Fishing, the U.S.S.R. maintains at Havana 2 fishery research vessels. They engage in an extensive fishery research program which benefits the Cubans at present, but which may be used by the Soviets once the Havana fishing port is completed (July 1966). The Soviet Union also contributes the services of 10 fishery scientists who are stationed in Cuba.

Note: See Commercial Fisheries Review, Mar. 1966 p. 17 and p. 27. (Summaries of foreign fishing activity off U. S. coasts formerly were reported in the section of Commercial Fisheries Review on "Trends and Developments," usually under the sub-headings: "Alaska" and "North Atlantic.")

EUROPEAN FISHERY EXHIBITIONS

RECENT AND FUTURE FISHERY TRADE FAIRS:

In Europe, international fairs or exhibitions are a well accepted and successful means of publicizing and marketing industrial and food products. International fishery fairs have become a part of this picture in the last decade and are increasing in number.

Sales prospects by exhibitors at European fishery fairs are not limited to Western European countries since representatives of developed and developing countries in Asia and Africa usually are in attendance. East Bloc countries both attend and exhibit. Poland has exhibited its line of fishing vessels at international fisheries fairs for a number of years, and East Germany has begun exhibiting refrigerating and reduction machinery.

International (Contd.):

Recent Fishery Fairs: Following is a brief listing of recent European fishery exhibitions:

meal and oil for feeding animals, worth \$167 million. Peru ranked third in the world, behind Japan and Canada, in fishery export earnings; it also imported 800 tons of fish worth \$573,000.

Exhibition	Attendance		Exhibitors	
	Persons	Countries	Individual Exhibitors	Countries Represented
	..... (Number)			
Third International Fishery Trade Fair-- Goteborg, Sweden, Nov. 1965	1/	1/	186	10
Second Official Fisheries Fair--Trondheim, Norway, Aug. 19-29, 1965	78,000	1/	185	8
World Fishing Exhibition--London, England, May 27-June 2, 1965	2/20,000	1/	200	12
Fifth International Fisheries Trade Fair-- Copenhagen, Denmark, Sept. 11-20, 1964	37,000	1/	200	14
World Fishing Exhibition--London, England, May 27-31, 1963	2/13,000	92	200	17
Fourth International Fisheries Trade Fair-- Copenhagen, Denmark, April 14-23, 1962	55,000	39	230	14
1/Data not available.				
2/Attendance was restricted to those with fishery interests--general public was excluded.				

Future Fairs: Fishery exhibitions planned in the future include: (1) the Fisheries Fair, Ostende, Belgium, Mar. 19-27, 1966; (2) the Biennial International Exposition of Fishing, Lorient, France, May 12-22, 1966; (3) the 6th International Fisheries Trade Fair, Copenhagen, Denmark, May 12-21, 1967; (4) the World Fishing Exhibition, London, England, May-June 1967; and (5) the Third Official Fisheries Fair, Norway, 1970. (Regional Fisheries Attache, United States Embassy, Copenhagen, December 15, 1965.)

Note: See Commercial Fisheries Review, Nov. 1965 p. 69, Sept. 1965 p. 79, May 1965 p. 52, and Dec. 1964 p. 91.

FOOD AND AGRICULTURE ORGANIZATION

SOUTH AMERICA EXPORTS

MORE FISH IN 1964:

The nations and territories of South America conducted international trade in fish and fish products totaling 1,777,000 metric tons worth US\$208 million in 1964, according to the Food and Agriculture Organization of the United Nations.

South America's fishery imports were 72,000 tons worth \$27 million. In 1963 the Continent's international fish exports amounted to 1,351,000 tons worth \$154.5 million; imports were 67,000 tons worth \$26.5 million.

The bulk of South America's international fish trade was Peru's 1,574,700 tons of exports, and the great majority of that was fish

Next in the South American group came Chile, with exports of 168,000 tons worth \$22 million. Chile imported \$62,000 worth of fishery products. Complete 1964 figures for Bolivia, Paraguay, and Venezuela were not available.

International fish trade figures for the other South American countries were:

Argentina--exported 3,400 tons worth \$570,000 and imported 4,600 tons worth \$1.4 million.

Brazil--exported 1,800 tons worth \$2.8 million, imported 26,300 tons worth \$14.6 million.

British Guiana--exported 3,100 tons worth \$4.1 million, and imported 3,200 tons worth \$1.5 million.

Colombia--exported 600 tons worth \$1 million and imported 10,600 tons worth \$1.8 million.

Ecuador--exported 8,100 tons worth \$3.5 million and imported 200 tons worth \$94,000.

French Guiana--exported 100 tons worth \$89,000 and imported 200 tons worth \$176,000.

Surinam--exported 800 tons worth \$886,000 and imported 1,500 tons worth \$700,000.

International (Contd.):

Uruguay--exported 800 tons worth \$114,000 and imported 900 tons worth \$533,000. (FAO, Bulletin of Fishery Statistics, No. 8, Fishery Commodities, 1964.)

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**WORLD FISHERY TRADE IN 1964
ESTABLISHES RECORD:**

International imports of fish and fish products reached a new high of US\$1,963 million in 1964, the latest year for which statistics are available, according to the Food and Agriculture Organization (FAO) of the United Nations. Exports were valued at \$1,739 million.

FAO warns, however, that its trade figures represent statistics forwarded to the organization by only 145 nations, about 88 percent of those engaged in commercial fishing. No trade figures were available for Mainland China.

About 41 percent of the 1964 record world fish catch of 51.6 million metric tons went into international trade in one form or another. The percentage for the 1963 world catch of 47.4 million tons was 37 percent.

The \$1,963 million value of international fishery imports was \$259 million above the total 1963 value of \$1,704 million. Exports in 1964 were valued at \$1,739 million, or \$210 million more than in 1963.

The leading nation in fishery export earnings was Japan, selling abroad 573,000 tons of fish worth \$248 million. Top fish importing nation was the United States, buying 976,000 tons worth \$488 million.

The volume of international trade--on a live weight basis--in fish and fish products, as compared with the total world catch, has increased steadily since World War II. In 1948 it was 20 percent, compared with 27 percent in 1954; it topped 32 percent, or about one-third of the world catch in 1960.

Some 68 percent, or above 35 million metric tons, of the 1964 catch was used for human consumption and was marketed fresh, frozen, cured or canned. About 32 percent, or above 16 million metric tons, was used for reduction to fish meal or oils for feeding animals.

About one-third of the 1964 catch (17 million tons) was marketed fresh. Some 16 percent, or above 8 million tons, was sold cured--smoked, salted, dried, etc. Frozen fishery products accounted for almost 10 percent (about five million tons) and canned fish products for over 8 percent (4.4 million tons).

Canada, second to Japan, exported 351,000 tons worth \$184 million. In third place came Peru, for the past three years the world's top fish-catching nation, with 1,575,000 tons of exports worth \$166 million. Peru's exports are mostly fish meal.

Fourth came Norway with 462,000 tons worth \$156 million. Denmark and her Faroe Islands ranked fifth, with exports of 388,000 tons worth \$118 million.

The only other nation to earn above \$100 million was Iceland, with 402,000 tons worth \$101 million.

Other nations exporting more than \$25 million worth of fish and fish products were: South Africa and Southwest Africa--401,000 tons worth \$74 million; Netherlands--206,000 tons worth \$57 million; United States--114,000 tons worth \$56 million; Mexico--41,000 tons worth \$51 million; U.S.S.R.--99,000 tons worth \$44 million (estimated); Portugal--106,000 tons worth \$49 million; Spain--77,000 tons worth \$35 million; Morocco--87,000 tons worth \$34 million; Federal Republic of Germany--81,000 tons worth \$31 million; Sweden--242,000 tons worth \$26 million; and United Kingdom--53,000 tons worth \$26 million.

Second largest fish importer was the United Kingdom with 710,000 tons worth \$275 million, followed by the Federal Republic of Germany, 796,000 tons worth \$158 million; and France 320,000 tons worth \$123 million.

Other Nations importing above \$25 million worth were: Italy--258,000 tons worth \$93 million; Japan--188,000 tons worth \$70 million; Netherlands--299,000 tons worth \$61 million; Belgium and Luxembourg--189,000 tons worth \$53 million; Sweden--139,000 tons worth \$49 million; Denmark and Faroe Islands--212,000 tons worth \$33 million; Hong Kong--69,000 tons worth \$32 million; U.S.S.R.--101,300 tons worth \$28 million; Australia--46,700 tons worth \$27 million; Switzerland--62,400 tons worth \$26 million. (FAO Bulletin

International (Contd.):

of Fishery Statistics, No. 8, Fishery Commodities, 1964.)

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FOOD IRRADIATION SYMPOSIUM CALLED:

An International Symposium on Food Irradiation will convene June 6-10, 1966, in Karlsruhe, West Germany. It is sponsored by the International Atomic Energy Agency and the Food and Agriculture Organization. Purpose of the meeting is to review the present status of food irradiation and assess its potential. Fish and seafoods are included. (United States Embassy, Vienna, January 12, 1966.)

INTERNATIONAL PACIFIC HALIBUT COMMISSION

NORTH PACIFIC HALIBUT REGULATIONS FOR 1966:

Fishing for halibut will begin May 9, 1966, at 6 p.m. Pacific Standard Time in the most important North Pacific areas (Areas 1, 2, and 3A), eight days later than in 1965, according to the recommendations of the International Pacific Halibut Commission to the Governments of the United States and Canada for the 1966 fishing season. The proposed 1966 regulations contain important changes from 1965. Among them are new designations for former areas 3B North to 4A and 4B; 3B Northeast to 4C, 4E, and part of 4D; and 3B Northwest to 4D West of 175° W. longitude.

The openings and closings of the various regulatory areas will be 6 p.m. Pacific Standard Time in Areas 1, 2, 3A, and 3B. In all other areas the opening will be at 3 p.m. and the closing at 6 p.m. local time.

Fishing areas in 1966 shall be: Area 1--south of Willapa Bay, Washington; Area 2--between Willapa Bay and Cape Spencer, Alaska; Area 3A--between Cape Spencer and the Shumagin Islands; Area 3B--the Shumagin Islands to Atka Island, not including the Bering Sea; Area 3C--west of Atka Island, not including the Bering Sea; Area 4A--the Bering Sea edge, Unimak Pass to the Pribilof Islands; Area 4B--Fox Islands grounds, Bering Sea; Area 4C--between the Pribilof Islands and 175° W. longitude; Area 4D--east of 175° W. longitude and north of a line between St. Paul Island and Cape Newenham and waters of the Bering Sea west of 175° W. longitude; and Area 4E--the flats east of Area 4A and south of the Cape Newenham line.

In Area 1, the fishing season, without catch limit, shall end at the same time as that in Area 2. (In 1965 Area 1 was closed on September 15, the date on which Area 2 closed.)

In Area 2 the fishing season shall end when the catch limit of 23 million pounds has been reached or on October 15, whichever is earlier. (The limit is the same as in 1965 and is 2 million pounds less than the quota of 25 million pounds in 1964. The catch limit in Area 2 in 1965 was attained by September 15 when the season closed.)

In Area 3A the fishing season shall end when a catch limit of 33 million pounds is reached or on October 15, whichever is earlier. (The limit is 1 million pounds less than in 1965 when it was attained on August 26 and the season was closed.)

In Area 3B the fishing season opened first on April 18 for 10 days and again on May 9 and will close when the catch limit of 3.5 million pounds is reached (including the amount taken during the first season of 10 days) or on November 15, whichever is earlier. (In 1965 the closing date for approximately this same area--Area 3B south--was September 30 when the catch limit of 4 million pounds was attained.) In Area 3C the fishing season, without catch limit, opened on March 25 and will close on November 15.

In Area 4A the fishing season opened for 9 days commencing on April 6 and ending on April 15, without catch limit. In Area 4B the fishing season shall be open for 9 days beginning on September 1 and ending on September 10, without catch limit. In Area 4C and 4E the fishing season opened on March 25 for 87 days ending on June 20, without catch limit. In Area 4D the fishing season opened on March 25 and will close on November 15, without catch limit.

There shall be no retention of halibut caught incidentally to fishing for other species in any area closed to halibut fishing.

In 1966 the Commission will provide 10 days' notice of closure of Areas 1 and 2; and 18 days' notice of closure of Area 3A; and at least 18 days' notice of closure of Area 3B.

The Commission's recommendations for the 1966 season were announced on February 4 at the conclusion of its 42nd annual meeting at Seattle, Wash., with Chairman William M. Sprules of Ottawa, Ontario, Canada, presiding.

International (Contd.):

The Halibut Commission, under authority of a Convention between the United States and Canada, investigates and regulates the halibut fishery of the northern Pacific Ocean and Bering Sea. Its function is the development of the halibut stocks to levels that will permit the maximum sustained yield. Its decisions regarding regulation of the fishery are required to be based on scientific findings.

A public session was held on February 1 at which time the 1965 fishery and the research conducted by the scientific staff were reviewed. On February 3, a meeting was held with the Conference Board, which consists of representatives of fishermen's unions and vessel owners, and with representatives of dealer organizations, at which time the Commission received various industry proposals for regulation of the fishery in 1966.

During executive sessions, the Commission dealt with administrative matters and approved a research program for 1966 continuing the 1965 program of tagging and assessment of the possible effects that foreign fishing may have upon the halibut stocks.

The Commission announced that the 1967 annual meeting will be held in Seattle, Wash. The date was not specified. Haakon M. Selvar of Seattle, Wash., was elected chairman, and Dr. William M. Sprules, vice chairman for the ensuing year.

Since in the past the United States and Canadian Governments have accepted the recommendations of the Commission without change, it is assumed that the 1966 regulations will likewise be approved as recommended.

Note: See Commercial Fisheries Review, April 1965 p. 43.

INTERNATIONAL PACIFIC SALMON FISHERIES COMMISSION

REGULATIONS FOR 1966 SOCKEYE AND PINK SALMON IN NORTH PACIFIC:

The tentative regulatory recommendations for control of the 1966 sockeye and pink salmon fishery in North Pacific Convention waters as submitted to the fishing industry on December 17, 1965, were reconsidered on the basis of suggestions made by the Advisory Committee at a meeting of the International

Pacific Salmon Fisheries Commission on January 14, 1966.

Action taken by the Commission in view of the Committee's representations:

1. The closure to all net fishing in both Canadian and United States Convention waters lying westerly of the Angeles Point-William Head line originally recommended to be "June 26 to August 6" was changed to read "June 26 to July 30."
2. No change was made in the previously established policy of the Commission on opening and closing hours for fishing in any of the Convention waters. If found to be practical on the basis of further study, consideration will be given during the fishing season regarding the weekly opening date in Canadian Convention waters to prevent movement of large numbers of gill-net boats from one fishing area to another.
3. In the Point Roberts area of United States Convention waters the Lily Point closure line was made effective for one week only commencing September 4 instead of the originally recommended two-week period commencing on the same date. The Iwersen dock line will be in effect from September 11 to October 1.
4. The Commission agreed that the conservation of sockeye would not be impaired by the use of spring salmon nets during the June 26-July 9 closure in United States Convention waters lying easterly of Angeles Point.

In finalizing its regulatory recommendations for the 1966 season the Commission emphasizes that there will be a need as in past years for adjusting fishing time during the season to provide for variation in the expected number of fishing boats, to meet individual escapement requirements, to reach parity in the catch by each country, and to allow adequate harvest of each major run. Notice of each regulatory change made during the fishing season will be given as far in advance as possible.

CANADIAN CONVENTION WATERS:

Area 20:

- | | |
|-----------------------------|---|
| June 26 to July 30 | - Closed to all net fishing. |
| July 31 to September 3 | - Purse seines open daily 6:00 a.m. to 6:00 p.m. Monday and Tuesday of each week. |
| | - Gill nets open daily 6:00 p.m. to 6:00 a.m. Monday afternoon to Wednesday morning of each week. |
| September 4 to September 10 | - Purse seines open daily 7:00 a.m. to 7:00 p.m. Monday and Tuesday. |
| | - Gill nets open daily 7:00 p.m. to 7:00 a.m. Monday afternoon to Wednesday morning. |
| September 11 | - Relinquish control. |

International (Contd.):

Areas 17, 18, 19 and District No. I:

- June 26 to August 6 - Open 8:00 a.m. Monday to 8:00 a.m. Wednesday of each week.
- August 7 to August 20 - Open 8:00 a.m. Monday to 8:00 a.m. Tuesday of each week.
- August 21 to September 3 - Open 8:00 a.m. Monday to 8:00 a.m. Tuesday of each week only in those waters of District No. I lying easterly of the Brunswick Cannery-Oak Street Bridge boundary.
- September 4 to September 10 - Open 8:00 a.m. Monday to 8:00 a.m. Tuesday.
- September 11 to September 17 - Open 8:00 a.m. Monday to 8:00 a.m. Tuesday only in those waters of District No. I lying easterly of the Brunswick Cannery-Oak Street Bridge boundary.
- September 18 to September 24 - Closed to all net fishing.
- September 25 to October 8 - Open 8:00 a.m. Monday to 8:00 a.m. Tuesday of each week.
- October 9 - Relinquish control.

Special Troll Restrictions:

Fishing for sockeye or pink salmon other than by angling or trolling for the purpose of personal consumption and not for sale or barter shall be prohibited in these Convention waters of Canada (the waters of Howe Sound excepted), lying easterly and inside of a straight line projected from Gower Point at the westerly entrance to Howe Sound to Thrasher Rock light, thence in a straight line to Salamanca Point on the southerly end of Galiano Island, thence in a straight line to East Point on Saturna Island, thence in a straight line towards Point Roberts light to the intersection with the international boundary line, thence following the international boundary line to its intersection with the mainland from the 21st day of August to the 8th day of October, both dates inclusive, except at the times that net fishing other than with spring salmon nets may be permitted within that area.

UNITED STATES CONVENTION WATERS:

West of Angeles Point-William Head line and East of Bonilla-Tatoosh line:

- June 26 to July 30 - Closed to all net fishing.

- July 31 to August 6 - Gill nets open daily 7:00 p.m. to 9:00 a.m. Monday afternoon to Wednesday morning.
- August 7 to September 10 - Gill nets open daily 7:00 p.m. to 9:00 a.m. Sunday afternoon to Tuesday morning of each week.
- September 11 - Relinquish control.
- East of Angeles Point-William Head line:
- June 26 to July 9 - Closed to all net fishing except with nets having a mesh of not less than $8\frac{1}{2}$ inches extension measure and under regulation by the Washington State Director of Fisheries.
- July 10 to August 6 - Gill nets open daily 7:00 p.m. to 9:00 a.m. Monday afternoon to Wednesday morning of each week.
- August 7 to October 1 - Gill nets open daily 7:00 p.m. to 9:00 a.m. Sunday afternoon to Tuesday morning of each week.
- September 4 to September 10 - Waters lying westerly of a straight line projected true south from Lily Point to the intersection with the international boundary line will be closed to all net fishing.
- September 11 to October 1 - Waters lying northerly and westerly of a line from Iwersen's dock on Point Roberts to Georgina light at Active Pass will be closed to all net fishing.
- October 2 - Relinquish control.

Notes: (1) Times are based on Pacific Daylight Saving Time.
(2) See Commercial Fisheries Review, April 1965 p. 45.

International (Contd.):

LAW OF THE SEA

CONVENTION ON FISHING AND CONSERVATION OF THE LIVING RESOURCES OF THE HIGH SEAS RATIFIED BY MEXICO:

On December 20, 1965, Mexico became the 21st country to ratify the Convention on Fishing and Conservation of the Living Resources of the High Seas. Twenty-two ratifications or accessions are needed for the Convention to enter into force.

The Convention has provisions which for the first time recognize the special interests of the coastal nations in maintaining the productivity of the high-seas resources adjacent to their territorial sea. On the other hand, the Convention sets forth standards which should discourage irresponsible action by coastal states seeking to extend their jurisdiction under the guise of conservation. This Convention is one of the four adopted at Geneva, April 29, 1958, by the United Nations Conference on the Law of the Sea. The other three Conventions (the Territorial Sea and the Contiguous Zone, the High Seas, and the Continental Shelf) have entered into force. Those Conventions were also ratified by Mexico on December 20, 1965.

NORTHWEST PACIFIC FISHERIES COMMISSION

MEETING, FEB. 25-MAR. 25, 1966:

The International Northwest Pacific Fisheries Commission (Soviet Union and Japan) met in the Soviet Union, February 25-March 25, 1966. This year's meeting, originally scheduled to open on March 1, was moved up to avoid overlap with the Soviet Communist Party Congress scheduled to open in Moscow on March 25. The Commission sets the annual Soviet and Japanese catch quotas for salmon, herring, and crabs in the Northwest Pacific Ocean.

The pact between the two countries, originally entered into in 1956, is due to expire at the end of 1966. The Japanese were concerned that the Soviets wished to discuss at this meeting, in addition to the catch quotas, the revision of the treaty and the Convention. To this the Japanese objected. They favored talks on treaty revision to be held separately from those held to set catch quotas.

The agenda proposed by the Soviet Union for the meeting did not, as has been the usual

practice, include a suggested date for the 1967 meeting. This has led to the belief in Japan that the Soviets intended to tie-in discussions on treaty revision with the quota negotiations. At this year's meeting the Soviets were expected to make a strong demand for a drastic cut in the Japanese salmon catch.

At any discussions on revision of the treaty the Japanese expected to raise a number of points which they consider especially disadvantageous to themselves. Some of these points are: (1) since the treaty covers only fishing operations on the high seas, the catch quotas affect only the Japanese; (2) restrictions are imposed not only on the Japanese catch but also on fishing areas, vessels, and gear; (3) the Commission's authority is too broad. (Various Japanese press items.)

**Argentina****GOVERNMENT REQUESTS JAPANESE HELP IN MAKING FISHERY MARKETING SURVEY:**

Argentina approached Japanese fishery officials in January 1966 and requested that a Japanese fishery team undertake a marketing survey in Argentina. The survey would be aimed at supporting Argentina's policy of developing a strong export trade in fishery products. (Suisancho Nippo, January 20, 1966.)

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JAPANESE-ARGENTINE JOINT FIRM PLANS TO PROCESS AGAR-AGAR:

A Japanese industrial firm and an Argentine firm are reported to be planning to establish a joint agar-agar processing company in Chubut Province in southwest Argentina in May or June 1966. The Japanese firm is to contribute 49 percent and the Argentine firm 51 percent of the total capital investment. In addition to manufacturing agar-agar, the joint company is expected to export to Japan seaweed harvested along the Argentine Bay of Bustamante. The Japanese Government was expected to give approval for the joint venture in Argentina. (Suisan Keizai Shimbun, December 24, 1965.)



Barbados

STATUS OF TUNA FISHERY, 1965:

Fishing for tuna and tuna-like species is carried out all year round within a radius of 35 miles around the island of Barbados. The principal method of fishing for this species is by trolling and drift fishing with lines--mainly single hook using live bait. The entire fishing fleet of over 400 vessels indulges in this fishery. The local type fishing vessel is 20-30 feet overall length and powered by 10-35 horsepower inboard diesel engines. No program for constructing tuna vessels is envisaged. The catch is sold fresh or placed in cold storage.

No biological or technological research is being conducted on tuna by Government or other installations. (United States Consulate General, Barbados, February 3, 1966.)



Canada

NEW HERRING REDUCTION PLANT FOR EAST COAST:

Plans for a new herring reduction plant in New Brunswick with a potential processing capacity of 15 short tons of herring an hour or 360 tons a day were announced in December 1965 by the New Brunswick Fisheries Minister. The new East Coast plant is to be set up in Lower Caraquet, New Brunswick, by a British Columbia firm and may be in operation by April 1966. The scale of initial operations will depend on the availability of herring.

At present, New Brunswick is using only about 4 percent of the potential herring harvest in the Gulf of St. Lawrence, according to some biologists. The new plant could extend the herring fishing season and create a market for herring on a continuing basis. New Brunswick fishermen now catch herring close to shore in the spring and fall with conventional gill nets. To test fishing farther offshore, the New Brunswick Department of Fisheries plans to charter the 80-foot steel herring seiner Quoddy Bay which can follow the herring migration when the fish move out to deep water in the summer. Other large herring vessels may operate in the area if the purse-seining by the Quoddy Bay proves successful. (Canadian Fisherman, January 1966, and other sources.)

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FEDERAL-PROVINCIAL DEVELOPMENT PROGRAM FOR FISHERIES IN NEWFOUNDLAND AND LABRADOR:

A substantial program for joint fisheries development projects in 1966 was announced January 19, 1966, by the Canadian Federal Fisheries Minister and the Newfoundland Minister of Fisheries.

The program, which is being carried out by the Newfoundland Fisheries Development Authority and the Industrial Development Service of the Federal Department of Fisheries, will be directed to a variety of operations to speed up the fisheries development of Newfoundland and Labrador. The projects it provides for will involve (1) the construction of a number of combination-type vessels, (2) demonstration of new and improved gear and equipment, and (3) the introduction of fishery techniques not presently used in Newfoundland. Several technical specialists will be made available to provide fishermen with the know-how essential to more efficient operations.

One of the most important projects is the development of a type of multipurpose fishing vessel on which a start was made in 1965. This is part of a program to introduce more efficient vessels to the Newfoundland fleet. The new vessels will be used for experimentation and demonstration on inshore and near-offshore grounds. They will make diversified operations possible by using the same vessels for dragging, seining, long-lining, gill-netting, and other methods. With larger and more mobile vessels, operators should be able to catch fish throughout most of the year, over an extended area, and utilize more species.

In announcing the new program, the Ministers stated that some projects will be carried out on a 50-50 basis, while for others, the Federal Government will meet 75 percent of the cost and the Provincial Government 25 percent, depending upon the nature of the undertaking. In several projects there will also be financial participation by the fishing industry. Technical assistance will be provided at Federal cost, and on an increasing scale, with specialists drawn not only from Newfoundland but from other areas of Canada and countries such as the United States, Great Britain, Norway, and Japan.

In describing some of the projects for 1966, the joint statement said that last year a survey was made by Scottish fishing skippers to

Canada (Contd.):

see if it would be feasible to introduce to the Newfoundland fisheries the Scottish version of seine netting for cod and other groundfish. This year some local Newfoundland vessels will be converted to Scottish seine netting. The Federal Department of Fisheries is trying to charter a Scottish seine-net vessel with its regular crew to demonstrate the method in Newfoundland.

There will be an exploratory fishing program in areas which hold promise for shrimp, since it is felt that this species could provide a profitable operation for many fishermen.

Squid fishery activities are to be expanded in 1966. Tremendous schools of squid move into the shallow waters off Newfoundland in the summer, but the traditional fishing season is relatively short, and from time to time the squid fail to show up, with resulting distress to fishermen. Squid are not only an export item but are the cod fishermen's first choice for bait. This year's squid project will lay emphasis on the catching of squid in deeper waters, and if successful will result in a longer squid season.

Snap-gear long-lining, a method used successfully on the Pacific Coast, is also to be introduced to Newfoundland. This gear is more versatile, more easily set and hauled, and more easily maintained than the long lines now in use in the Atlantic.

The Ministers also referred to the herring fishery, stating that it will play an ever-increasing role in the development of Canada's Atlantic fisheries. With large stocks of herring available and a growing market for that fish, not only for meal and oil but also for human consumption, a determined effort is being made to establish a pattern for year-round exploitation.

The introduction of synthetic materials in the making of cod traps is a project of interest to Newfoundland fishermen. The Icelandic method of cod seining is another. On-the-spot studies of this method were made last year and it is thought that it could have application to the Newfoundland cod fishery.

The Federal and Provincial governments, in cooperation with Memorial University, have completed a survey of the Labrador fishery in order to determine the best approach

to its commercial development. Although the full report is not yet available, provision has been made for this historically important fishing area to benefit from the current program. (Canadian Department of Fisheries, Ottawa, January 19, 1966.)

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BRITISH COLUMBIA LANDINGS, 1965:

A record silver salmon catch of 36.7 million pounds and a top price of 40 cents a pound for halibut highlighted the annual 1965 British Columbia catch statistics issued by the Canadian Department of Fisheries in Vancouver, B. C. The total ex-vessel value of all fish landings for the Province in 1965 totaled C\$47.4 million down \$900,000 from 1964.

Salmon landings were down sharply, totaling 95 million pounds. That was second only to the alltime low of 1960. The British Columbia salmon pack for 1965 amounted to 913,000 cases compared to 1,255,000 cases in 1964.

In spite of the overall low level of salmon landings, British Columbia fishermen took a record high silver salmon catch of 36.7 million pounds worth C\$11.1 million ex-vessel. The previous high was in 1951 when fishermen landed 35.2 million pounds.

The total landings of sockeye in 1965 were 16.2 million pounds worth C\$6 million; in 1964 they were 23 million pounds valued at C\$8.3 million.

The catch of king salmon in 1965 was 12.7 million pounds valued at C\$5.3 million.

For pink salmon, the total production was 23 million pounds worth C\$2.7 million as compared to the cycle year of 1963 which produced 60.1 million pounds worth C\$6.1 million.

The total production of chum salmon in 1965 was the lowest of any year on record, totaling only 6.7 million pounds worth C\$824,000. The previous low was in 1961 when fishermen brought in 14.6 million pounds. The total ex-vessel value of all salmon landed in the Province was C\$26 million in 1965 as compared to C\$30.2 million in 1964. In spite of the overall drop in salmon production in 1965, the trollers had an alltime record year because of the record silver catch.

The landings of halibut increased sharply during 1965 and coupled with record high prices,

Canada (Contd.):

yielded alltime high ex-vessel returns C\$11.1 million. The average price during the season was 33.7 cents a pound with the high reaching 40 cents a pound at both Prince Rupert and Vancouver. British Columbia fishermen landed 33 million pounds of halibut at both Canadian and United States ports.

The value of herring increased slightly during 1965 because of higher prices to the fishermen. Total herring production during 1965 was 222,000 short tons with a value of C\$6.23 million as compared to 252,000 tons in 1964 worth C\$6.17 million.

For other species, the highlight was landings of grey cod, totaling 19.2 million pounds worth C\$1.1 million as compared to 12 million pounds in 1964 worth C\$720,000.

Crab production was down, totaling 3.5 million pounds in 1965 worth C\$552,000 as compared to 4.35 million pounds worth C\$699,000 in 1964.

The production of oysters showed a slight drop, totaling 151,000 shucked U. S. gallons worth C\$612,000 as compared to 154,000 shucked U. S. gallons worth C\$588,000 in 1964.

The production of shrimp was up sharply although still not a record year, with a volume of 1.76 million pounds, worth C\$281,000 as compared to 1.05 million pounds worth C\$161,000 in 1964. (Canadian Department of Fisheries, Vancouver, January 28, 1966.)

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NEW LICENSING SYSTEM FOR BRITISH COLUMBIA FISHERMEN AND VESSELS:

Details of a new system of licensing fishermen and fishing vessels on the Pacific coast were announced January 25, 1966, by the Canadian Minister of Fisheries. The new system went into effect April 1, 1966.

Under the new system, a personal fishing license costing C\$5 annually will be required for all wishing to engage in commercial fishing operations in British Columbia. The license is available from any office of the Department of Fisheries in British Columbia.

In addition, all vessels engaged in any commercial fishing operation are to be registered

at Pacific Area headquarters of the Department of Fisheries of Canada in Vancouver. The annual cost of registration is C\$10 and commercial fishing license plates will be issued. Applications for vessel registration are to be available from all Fisheries offices in the Province.

Any vessel participating in the salmon fishery will be required to obtain an additional license for which a fee of C\$5 will be charged in 1966. This year, the salmon license fee will not be based on the size of a vessel as proposed earlier. A meeting of Canadian Federal officials with representatives of British Columbia's fishing industry was scheduled in February 1966 to consider further steps which may be taken to control fishing effort in the salmon fishery. (Canadian Department of Fisheries, January 25, 1966.)



Chile

FISH MEAL INDUSTRY, 1965, AND FUTURE PROSPECTS:

By all accounts 1965 was a disastrous year for the fish meal industry in northern Chile. With the return of the anchovy to the northern coast in the second week of December, however, the prolonged period of resource famine (extending more than 20 months) showed promise of ending. Preliminary figures for December show a catch of 94,000 tons--the highest for any month since February 1964--which was accomplished despite strikes (which kept most vessels idled until December 8 and 16 in Iquique and Arica respectively), the year-end holidays, and a reduced operational fleet (due to lack of maintenance during the months the purse seiners remained in port). The December catch raises the total for the year to about 415,000 tons (the lowest annual figure since 1961) but more importantly offers new hope for a return to normalcy in the new year. Some observers are predicting that Chile will export 150,000 tons of fish meal in 1966.

The extent to which the fish return and to which the industry responds to the opportunity thus presented will also be significant factors affecting the future control and operation of the industry. During the past year, Chile's Corporación de Fomento de la Producción (CORFO), a Government planning agency, has

Chile (Contd.):

come under increasing pressures from many directions to institute a comprehensive program to rationalize the industry and revitalize the economy which it largely supports. Through October CORFO measures were directed principally at curtailing expansion of the fish meal industry and sustaining a minimum level of economic activity through various ad hoc measures (e.g. loans, public works projects). Additionally, a new fisheries bill, designed to provide payment in part of export bonuses in arrears and to ease plant mergers and moves was introduced in the Congress. This bill was approved in early 1966 by the Lower House and was passed on to the Senate.

As it became increasingly evident that the fish were not returning, pressures on CORFO to take stronger action grew more intense, and at the year's end, the Development Corporation announced that plans had been concluded to reorganize and restructure several of the plants (especially in Iquique) with increased financial assistance from CORFO accompanied by direct Government participation in both ownership and management.

The lessons so clearly imparted during the prolonged resource shortage were: (a) the Chilean fish meal industry was overexpanded, overconcentrated, and overspecialized; and (b) an export-oriented industry must operate efficiently if it is to meet competition in the world market. Additionally, the period of hardship demonstrated that some plants were able to rationalize operations beyond prior expectations. (United States Embassy, Santiago, January 26, 1966.)



Cuba

HAVANA FISHING PORT TO OPEN SOON:

Havana fishing port will be finished on or about July 26, 1966, to celebrate the Cuban revolutionary holiday, according to Cuban sources. Built at a cost of 30 million pesos (US\$30 million), the Havana port will accommodate 130 medium (250-600 gross tons) Cuban and Soviet fishing vessels.

CUBAN FISHING VESSEL
UNDER SOVIET MASTER:

The 60-gross-ton Cuban fishing vessel Perca F-0-7006 arrived at Progreso (Yuca-

tan Peninsula, Mexico) to put ashore a sick Cuban crewman. The crewman was transferred to the Perca from his own vessel, the Victoria I, at Isla Mujeres.

The Master of the Perca is a Russian national; however, the First Officer and Chief Engineer are Cuban nationals. The Perca carries a crew of 31. (U. S. Consulate, Merida, December 17, 1965.)

Editor's Note: The Victoria class of vessels is being built in Victoria de Giron Shipyards at Cardenas. Six of these 180-gross-ton vessels, the largest of domestically-built Cuban fishing vessels, are being constructed.



Denmark

FISH MEAL, OIL, AND SOLUBLES
PRODUCTION, 1964-1965;
EXPORT TRENDS, DECEMBER 1965:

In 1965, Denmark produced 114,297 metric tons of fish meal, 40,364 tons of fish oil, and 16,774 tons of fish solubles. In 1964, output was 113,391 tons of fish meal, 34,772 tons of fish oil, and 11,841 tons of fish solubles.

In December 1965, Denmark exported 5,063 tons of fish meal including 4,615 tons of herring meal and 448 tons of other fish meal. The leading buyers were the United Kingdom with 1,414 tons, Hungary with 680 tons, Spain with 580 tons, and Poland with 500 tons. Most of the remainder went to West Germany, Switzerland, Sweden, and the Netherlands. Danish exports of fish solubles in December 1965 totaled 1,468 tons, almost all of which went to West Germany. (Regional Fisheries Attache, United States Embassy, Copenhagen, February 4, 1966.)

MINIMUM POND TROUT PRICES ASKED:

In late 1965, it was thought that Danish pond trout prices might be stabilized after a lengthy, declining, and erratic market if the Danish Fisheries Ministry could establish and police minimum export prices as requested by the Danish trout producers and exporters. Nearly all of Denmark's 20-million-pound annual production of pond trout is exported.

Denmark (Contd.):

EEL STUDIES IN THE SARGASSO SEA:

Eel eggs and sexually mature spawning eels are to be sought in the Sargasso Sea (between Bermuda and Puerto Rico) by Danish scientists during a 4-months expedition which left Copenhagen on the research vessel Dana, January 4, 1966. A Danish scientist found eel larvae there in 1913, but neither eggs nor mature eels were ever discovered in the area. Danish biologists believe European eels stop eating and swim 2,500-3,000 miles to the Sargasso Sea to spawn. Since experiments have indicated that eels spawn at about 68° F., the search will begin at the depth where that temperature occurs. Pelagic trawls, echo-sounders, ASDIC, and other sophisticated equipment will be used.

Other scientists aboard will sample water for radioactivity and measure the depth to which sunlight penetrates in the great deeps.



El Salvador

FOREIGN FISHING VESSELS PERMITTED TO ENTER EL SALVADOR PORTS:

Foreign fishing vessels are permitted to enter El Salvador ports if necessary due to adverse weather conditions, according to an official in the Fisheries Section of the Ministry of Economy. Permission to offload catch would be handled on a case by case basis similar to treatment permitted by U. S. Bureau of Customs regulations. (U.S. Embassy, San Salvador, February 4, 1966.)



Faroe Islands

LANDINGS AND EXPORTS AT RECORD LEVEL IN 1965:

In 1965 Faroese fishermen landed 144,000 metric tons of fish, surpassing 1962's record total by 500 tons. Faroese exports of fishery products reached a new record value of 172 million kroner (about US\$24,940,000). Salted cod and herring prices were higher and fillet production about doubled. A Faroese vessel caught 40 tons of Atlantic salmon off West Greenland in gill nets. Faroese purse seiners landed North Sea herring in Denmark. The average daily income of fishermen on

vessels increased about 25 percent from 1964 levels to \$9.57.



India

STANDARDS FOR SHRIMP EXPORTS:

Compulsory quality controls of frozen and canned shrimp for export have been introduced by the Indian Government.

India's new shrimp standards are part of a larger inspection system covering other exports and is under the control of the Central Ministry of Commerce (Export Act). It is directed by the Central Institute of Fisheries Technology.

Before putting the quality control program into effect, a great deal of investigation and research was carried out. Health authorities in interested importing countries were consulted as to their requirements. Standards of quality and packaging were set up. A careful system of tests and methods of sampling were devised.

The quality control program began functioning on a voluntary basis in 1964 with participation by most of the major elements of the industry. After a trial period in which various problems of operation were solved, the Central Government of India declared the program compulsory early in 1965.

Before making a shipment, a packer must notify the Institute at least 12 hours before loading. The laboratory sends trained samplers to the warehouse where random samples are drawn based on the size of the proposed shipment.

Packers are required to code-mark all export production so a careful check can be made on all lots sampled. Samples are taken to the nearest laboratory of the Institute, where the testing is carried out.

Tests are always on an organoleptic basis and conform to the requirements of the Indian Standards.

If it appears necessary, or is requested by the packer, bacteriological tests are carried out. After the tests are completed and approved, an Inspection Certificate giving the pertinent details is issued and must be submitted to the

India (Contd.):

Indian Customs before export shipment can be made.

The rapidly expanding shrimp industry of the west coast of India, numbering over 30 plants, is lending full support to the quality-control program, realizing that a reputation for a high-grade product cannot help but improve markets and export earnings. (Fish Trades Review, December 1965.)



Israel

TUNA FISHING ACTIVITY
IN THE ATLANTIC:

Israel has one 500-ton tuna vessel operating in the Atlantic. Fishing in southern waters with long-line gear, the vessel lands 600-800 tons of tuna annually in South Africa where it is transshipped to Israel. The catch averages from 50 to 75 percent yellowfin, from 20 to 40 percent bluefin tuna, and about 10 percent big-eyed. (United States Embassy, Tel Aviv, January 19, 1966.)



Japan

FROZEN TUNA MARKET PRICE
HIGH IN JANUARY 1966:

The export price of Japanese frozen albacore tuna continued to rise and reached a new high in January 1966 of \$450 a short ton delivered to Puerto Rico and \$460 per ton c.i.f. delivered to California. In November 1965 U. S. buyers had been offering \$425 a ton c.i.f. for that same species.

Dressed yellowfin tuna deliveries to Italy in January 1966 were quoted at a high of US\$525-530 a metric ton c.&f. as compared with \$490-495 a ton in mid-December 1965. Frozen round albacore tuna exported to that country was quoted at \$500 a metric ton c.&f., or about \$25 a ton below the yellowfin price.

The ex-vessel albacore tuna price in Japan as of mid-January 1966 was reported to be 155-160 yen a kilogram (\$391-403 a short ton).

The Japanese trade was speculating as to the future trend and it was generally believed

that the frozen albacore price would rise to \$500 delivered to California. This was based on the U. S. canners' requirements for more raw material to meet the demand for the Lenten period, February 23 through April 8, 1966. Some Japanese believed that U. S. canners, especially "private label" packers, might not purchase additional albacore and that the price would level off. However, most Japanese traders felt that the demand would be so strong as to force the price to continue up, especially since a price increase had been noted in the price of the canned product in the United States. (Suisan Tsushin, January 10, 1966, Katsuo-Maguro Tsushin, January 14, 1966, and other sources.)

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FROZEN TUNA EXPORTS TO U. S.
AND PUERTO RICO, NOVEMBER 1965:

Japan's exports of frozen tuna to the United States and Puerto Rico in November 1965 were down markedly as compared with exports in the month of October. There was a drop of 58 percent in quantity and 65 percent in value.

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, Nov. 1965 and Oct. 1965				
Species	November		October	
	Qty.	Value	Qty.	Value
	Short Tons	US\$ 1,000	Short Tons	US\$ 1,000
Albacore:				
United States ..	539	175	2,593	905
Puerto Rico ...	1,096	351	2,734	893
Total	1,635	526	5,327	1,798
Yellowfin:				
United States ..	290	94	1,587	566
Puerto Rico ...	135	28	750	218
Total	425	122	2,337	784
Big-eyed:				
United States ..	-	-	9	2
Puerto Rico ...	-	-	34	7
Total	-	-	43	9
Skipjack:				
United States ..	-	-	-	-
Puerto Rico ...	1,127	156	-	-
Total	1,127	156	-	-
Other:				
United States ..	-	-	-	-
Puerto Rico ...	73	15	-	-
Total	73	15	-	-
Total United States	829	269	4,189	1,473
Total Puerto Rico	2,431	550	3,518	1,118
Grand total	3,260	819	7,707	2,591

Source: Japan's Bureau of Customs.

Japan (Contd.):

Shipments of skipjack and "other tuna" to Puerto Rico were made for the first time in several months. (Fisheries Attache, United States Embassy, Tokyo, January 19, 1966.)

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CANNED TUNA IN BRINE EXPORT MARKET, JANUARY-FEBRUARY 1966:

February 1966: The Japanese Government (as a result of the failure of tuna packers and exporters to renegotiate a new export agreement) extended by 1 month, to February 28, 1966, the 2-month interim export validation procedure instituted by the Government in December 1965 to permit canned tuna in brine exports to the United States, pending conclusion of a new export agreement. The Government's action was based on the provisions of the Trade Control Ordinance, which permits it to invoke an interim export validation procedure in the absence of an exporters' agreement.

Japanese Canned Tuna in Brine Export Prices (f.o.b. Japan), February 1966			
Type of Tuna Pack	New Price	Increase Over Jan. Price	Increase Over Nov. 1965 Price
Can & Case Size:	..... (US\$/Case)		
Whitemeat:			
7-oz. 48's	10.50	0.30	1.60
13-oz. 24's	9.70	0.30	1.50
4-lb. 6's	10.90	0.35	1.10
Lightmeat:			
7-oz. 48's	8.95	0.30	1.80
13-oz. 24's	8.60	0.25	1.95
4-lb. 6's	9.45	0.40	1.00

For February, the Government authorized for export to the United States a total of 300,000 cases of canned tuna in brine, of which 210,000 cases were allocated to exporters as merit quota (based on past performance) and 90,000 cases as adjustment quota. At the same time, the Japan Canned Tuna Sales Company, which handles sales to exporters, announced the third increase in export prices since December 1965, ranging from 25-40 U. S. cents a case.

The Sales Company as of early February 1966 had available for export a total of about 656,000 cases of tuna in brine, consisting of 588,000 cases of whitemeat and 68,000 cases of lightmeat. After the February sale, the Company was expected to have in stock only whitemeat tuna in cases of 48 7-oz. cans. (Suisan Tsushin, February 1, 5, & 7, 1966, and other sources.)

January 1966: The Japan Canned Tuna Sales Company planned to offer for the January 1966 sale a total of 320,000 cases of canned tuna in brine for export to the United States. This quantity was the remainder of the 500,000 cases of canned tuna authorized earlier by the Japanese Government for export during December 1965-January 1966, pending conclusion of a new exporters agreement (old agreement expired November 10, 1965). In December 1965, a total of 180,000 cases were sold to exporters.

For the January sale, the Sales Company announced a price increase of 50 cents a case for both whitemeat and lightmeat tuna packed in 7-oz. cans (48 cans per case) to \$10.20 and \$8.65 a case respectively, f.o.b. This was the second price increase in two months. In December 1965 the Sales Company raised prices an average of 70 cents a case for whitemeat tuna and 20 cents a case for lightmeat tuna. (Katsuo-Maguro Tsushin, January 14, 1966.)

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EXPORTERS' VIEWS ON PACKERS' PROPOSAL TO CHANGE CANNED TUNA EXPORT POLICY:

The Japan Tuna Packers Association, following a meeting held February 7, 1966, announced its intention to approve the export of canned tuna in oil to the United States and of canned tuna in brine to Europe. At present, Japanese canned tuna exports to the United States are limited to tuna packed in brine. Exports to Europe are limited to oil-packed tuna.

Concerning this proposed change in policy, Japanese trading firms were reported to hold these views:

(1) Exporters have been wanting to export canned tuna in oil to the United States and therefore welcome this proposal. However, in view of the 35-percent ad valorem duty assessed by the United States on canned tuna in oil imports, it is inconceivable that the proposed export approval would immediately result in volume sales of that product to the United States. In fact, it is possible that no sales will be made for a while, and even in the future no hope can be held for large shipments. If any at all, chunk-style canned skipjack tuna appears to hold some promise, but even that product would be difficult to export unless the ex-vessel price of skipjack in Japan drops considerably.

Japan (Contd.):

(2) Assuming B-grade canned tuna in brine can again be packed in large quantities, exporting that product to Europe would be preferable to exporting it to the United States. The trading firms therefore support the Association's proposal, but believe it will likely take a long time to establish in Europe a market for canned tuna in brine such as that which exists in the United States. (Suisan Tsushin, February 10, 1966.)

Note: Under the U. S. Tariff Act, canned tuna in brine imports not in excess of 20 percent of the U. S. domestic pack of canned tuna in the preceding year are dutiable at the lower rate of 12 $\frac{1}{2}$ percent ad valorem. Imports in excess of that quota are dutiable at 25 percent ad valorem. A 35-percent duty is levied on imports of canned tuna packed in oil.

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TUNA LANDINGS IN YAIZU, JAPAN, JANUARY 1966 AND YEAR 1965:

January 1966 fish landings at the Japanese port of Yaizu (principal tuna port) totaled 8,078 metric tons, an increase of 997 tons over the same period in 1965.

Landings in Yaizu, Japan, January 1966 with Comparisons

Species	January 1966		January 1965		December 1965		December 1964	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Metric Tons	US\$1,000	Metric Tons	US\$1,000	Metric Tons	US\$1,000	Metric Tons	US\$1,000
Bluefin	5,677	3,128	5,025	2,278	7,345	3,942	7,016	3,394
Albacore	703	303	540	194	995	391	822	270
Skipjack	717	180	328	69	1,478	344	1,852	373
Mackerel	222	35	481	80	-	-	-	-
Others	759	203	707	157	2,253	362	1,072	265
Total	8,078	3,849	7,081	2,778	12,071	5,039	10,762	4,302

Fish landings at Yaizu, in December 1965 totaled 12,071 metric tons valued at 1,814 million yen (US\$5.04 million), according to data published by the Yaizu Fishery Cooperative Association. This was 54 percent more in quantity and 84 percent more in value than landings in November 1965, which totaled 7,863 metric tons valued at 987 million yen (\$2.74 million). Compared to December 1964, landings in December 1965 were up 12 percent in quantity and 17 percent in value.

January-December 1965 fish landings at Yaizu were 149,168 metric tons valued at \$49.2 million, compared with 147,353 metric tons valued at \$42.6 million in 1964. By species, the quantities landed in 1965 were: bluefin 63,416 metric tons; albacore 30,396 tons; skipjack 31,985 tons; mackerel 14,927 tons; others 9,944 tons. (Kanzume Nippo,

February 7, 1966, Suisancho Nippo, January 8, 1966.)

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TUNA MOTHERSHIP-TYPE PURSE-SEINE TEST FISHING OFF WEST AFRICA:

The Japanese mothership-type purse-seine test fishing in the Atlantic off West Africa in 1965 was far from satisfactory, according to the Managing Director of the firm conducting the operation. However, he said "... but we plan to expand our operations in 1966." He made the statement after he returned from an inspection trip to the Atlantic. According to the Managing Director, a pair of 2-boat purse-seiners (90 gross tons each) will be dispatched to join the firm's Atlantic fleet, led by the 1,600-ton mothership Chichibu Maru and including the 145-ton pair-boat purse-seiners Kuroshio Maru Nos. 81 & 82.

In 1965, the Chichibu Maru fleet landed 4,000 metric tons of fish, consisting of 45 percent skipjack tuna, 35 percent yellowfin tuna, and 20 percent bonito. (Note: Earlier

reports indicated the catch consisted of 50 percent yellowfin, 40 percent skipjack, and 10 percent miscellaneous species.) The Managing Director stated the rapid current flow and depth of the thermocline (about 160 feet) created problems in setting on fish but the firm hoped to overcome those conditions by enlarging the mesh size of the purse seine and by making other modifications. (Shin Suisan Shimbun Sokuho, January 19, 1966.)

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GOVERNMENT-INDUSTRY REPORT ON ASSESSMENT OF TUNA RESOURCES:

The Japanese Government, after meeting with the tuna industry on January 27, 1966, released a report entitled, "Assessment of the Current Tuna Fishery and Direction of Countermeasures." The report consolidates the views of Government and industry officials exchanged at five earlier discussion meetings aimed at seeking ways and means of helping

Japan (Contd.):

the depressed tuna fishing industry. The gist of the report was:

(1) Resources: When consideration is given to the results of analysis performed on the 1962-63 data and to the catch effort and catch volume after 1963, the possibility that reproduction of resources has not been maintained is conceivable. However, the present status of the resources is not known since the analysis of recent data has not been completed. In order to assess the condition of resources, the collection of data, expansion of the research structure, and the automation of data processing should be promoted. Catch effort should be held at the present level until the condition of the resources and trends can be definitely grasped.

(2) Current resource assessment by species: The albacore resource in the North Pacific has generally leveled off and recruitment has not changed significantly. Other than in the North Pacific, catches will tend to decline.

Size of the yellowfin stock, in terms of number of fish available to the long-line fishery, in the Pacific Ocean east of 180° longitude declined to 50 or 25 percent of the initial stock size during the period 1952-62, so increases in total catch beyond the present level cannot be expected. In the Indian Ocean it has decreased overall to 50 percent or less during the period 1952-62. In the Atlantic Ocean it has declined to approximately one-third during the period 1956-62.

The total catch of big-eyed tuna in the Pacific Ocean reached a peak in or about 1961-62. The bluefin resource off Japan is believed to have increased since 1960. The total catch of southern bluefin is believed to have reached the maximum level. The present state of skipjack resource is unknown.

(3) International developments: In the eastern Pacific and Atlantic Oceans, movements are under way to internationally regulate the tuna fisheries based on scientific research, and there are indications of further expanding regulations to cover other areas. In view of the strong interest in the tuna fishery shown by other countries, a worldwide increase in fishing intensity likely will continue in the future unless international restrictions are imposed to manage the resources. Japan

should positively assume the position of leadership in the movements aimed at international management of the resources.

(4) Development of new fishing grounds: On the whole, great hope cannot be placed on untapped resources.

(5) Management conditions: Management conditions are considered as having generally deteriorated, and since 1964 management has been beset by numerous adverse factors. As a result, some fishery operators have gone bankrupt or are on the verge of bankruptcy. Under present conditions more bankruptcies are likely to occur. To improve management and to rationalize operations in order to strengthen Japan's competitive position internationally, existing governmental restrictions should be relaxed as much as possible.

A basic policy to improve the economic position of fishery operations, and to stabilize and rationalize management should be developed and progressively implemented. For the time being, it would be desirable to develop special financial measures in parallel with the financial effort expended by the industry. In implementing the basic measures, the situation confronting the fishery operators must be studied. Problems, such as bankruptcy, arising in the course of rationalization, should be dealt with appropriately in order not to adversely affect other industries. It is desirable to increase the catch per unit of effort, and to achieve this aim the opinion has been raised that the overall catch effort should be reduced.

(6) Factors adversely affecting management: They include the rising cost of labor and other expenses, fish price fluctuations, reliance on investment loans, inadequate financial management, unsound financial plans, and weak management base. To overcome them, the adoption of labor-saving techniques, capital accumulation, and sound management practices are essential.

(7) Assessment of current marketing and sales practices: To satisfy foreign demand, close to 50 percent of the tuna catches are exported in frozen or canned form, and their quantities are steadily increasing. However, exports of yellowfin tuna products are gradually declining. In view of the advancement into the tuna market by other countries, Japan must actively develop new frozen and canned tuna markets in the United States and Europe.

Japan (Contd.):

Exports of Atlantic albacore should be regulated and the domestic albacore market expanded. From catch to sales, the fishermen, producers of export fishery products, domestic buyers, and trading firms must maintain close contact with each other to improve the method of sales under a unified overall plan so as to sell good quality products at stable and reasonable prices. Since excessive participation of trading firms in fishery operations is likely to hamper production and sales activities, there is a need to cooperate with financial institutions in seeking ways of eliminating those problems soon. (Suisancho Nippo, January 29, 1966.)

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EXPORTS OF FROZEN RAINBOW TROUT, NOVEMBER 1965:

Japan's exports of frozen rainbow trout in November 1965 dropped substantially as compared with the previous month--about 26 percent in quantity and about 36 percent in value. The entire decrease was accounted for by a drop in exports to the United States, which nevertheless still remained Japan's best customer for this product, taking slightly over 60 percent of the total in November 1965.

Japan's Exports of Frozen Rainbow Trout by Country of Destination, November 1965		
Destination	Quantity Short Tons	Value US\$
United States	80	57,069
United Kingdom	12	7,986
Belgium	28	20,619
Canada	11	8,533
Netherlands	6	4,664
Norway	6	3,872
Australia	6	4,606
Sweden	1	711
Other	3	1,861
Total	153	109,921

Source: Japan's Bureau of Customs.

There were increases in exports to Belgium, Norway, and Australia, whereas there were decreases in exports to the United Kingdom, Canada, and the Netherlands. (Fisheries Attache, United States Embassy, Tokyo, January 19, 1966.)

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EXPORTS OF MARINE PRODUCTS, SEPTEMBER 1965:

Japan's exports of marine products during September 1965 consisted of principally fresh and frozen fish, and canned fishery products.

Japan's Exports of Marine Products, September 1965		
Product	Quantity	Value
	Metric Tons	US\$ 1,000
Fresh & Frozen Fish:		
Tuna, skipjack	400	61
Tuna, other	13,458	4,719
Marlin	1,041	725
Sea bream	4,101	616
Mackerel	157	30
Saury	284	83
Salmon	12	19
Other fish	3,126	1,167
Total	22,579	7,420
Cured:		
Cod	8	5
Boiled & dried	29	11
Shark fins	82	144
Other	12	8
Total	131	168
Shellfish, etc.,		
fresh, frozen, dried:		
Scallops	2	16
Oysters	19	22
Shrimp	196	363
Squid	2,143	377
Octopus (fresh)	54	25
Other	9	13
Total	2,423	816
Canned:		
Salmon	6,044	9,444
Tuna, skipjack	979	780
Tuna, other	1,413	1,305
Mackerel	2,074	758
Saury	118	58
Sardine	45	19
Horse mackerel	695	227
Other fish	1,888	1,402
Crab	511	1,466
Shrimp	51	122
Squid	502	166
Other shellfish	797	688
Total	15,117	16,435
Other Products:		
Seaweed, kombu	123	75
Agar agar	51	191
Seaweed, laver 1/	116	5
1/In 1,000 sheets.		

(Fisheries Attache, United States Embassy, Tokyo, January 19, 1966.)

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EXPLORATORY TRAWL FISHING IN SOUTHERN LATITUDES:

The 757-ton Japanese trawler Chiyoda Maru No. 5, dispatched by a Japanese fishing firm to the Antarctic Ocean to develop new fishing grounds, was reported to be operating near Falkland Island, off the southeastern coast of South America. Her catches consisted mainly of "merluzza" (hake), which in early December 1965 averaged 4-5 metric tons a day. Other catches included small quantities of shrimp and crab. The trawler continued operations off South America until the end of January 1966, following which she was scheduled to proceed eastward along the latitudes 50°-60° S. toward the waters south of Africa.

Japan (Contd.):

In late November 1965, the Chiyoda Maru explored the waters off New Zealand, where her catches consisted primarily of Spanish mackerel. The expedition has not proven the feasibility of establishing a commercially profitable trawl fishery in the Antarctic waters. (Shin Suisan Shimbun Sokuho, January 19, 1966.)

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FISHERIES AGENCY BUDGET
FOR FY 1966:

The Japanese Cabinet on January 14 approved a general account budget for fiscal year 1966 (Apr. 1966-Mar. 1967) for submission to the Diet (parliament), which convenes in late January. Funds requested for the Fisheries Agency, Ministry of Agriculture and Forestry, total 24,200 million yen (US\$67.2 million), an increase of 4,002 million yen (\$11.1 million) or about 20 percent over 1965's regular fishery budget of 20,198 million yen (\$56.1 million). The proposed increase in the fishery budget is considerably higher than any past increases approved by the Cabinet.

Japanese Fisheries Agency Budget for Some Fishery Programs, FY 1966 and 1965				
Program	FY 1966 Budget		FY 1965 Budget	
	1,000 Yen	US\$	1,000 Yen	US\$
Improvement of vessel gear and shipboard medical services	38,000	105,556	-	-
Improvement in weather and fishing forecasts	29,000	80,556	24,000	66,667
Resource conservation (incl. water pollution control)	482,000	1,339,000	473,000	1,314,000
Measures to improve marketing of fishery products	351,000	975,000	252,000	700,000
Sea-farming development surveys	19,000	52,778	12,000	33,333

New programs in the FY 1966 fishery budget include, among others, extension of a \$14,000 Government subsidy to improve medical services aboard fishing vessels engaged in high-seas fisheries, \$83,000 for installation of labor-saving devices aboard the 602-ton Government research vessel Shoyo Maru, and \$7,000 for long-line gear research. The proposed budget also includes a large increase in funds for the promotion of frozen fishery products on the Japanese domestic market and a request for additional funds for sea-farm development projects. (Suisan Keizai

Shimbun, January 17; Minato Shimbun, January 15, 1966.)

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CONSTRUCTION OF UNDERWATER
RESEARCH VESSEL PLANNED:

The Japan Science and Technology Agency is planning to build an underwater research craft over a 3-year period at a total cost of 300 million yen (US\$833,333). The Agency hoped to begin working closely in April 1966 with other concerned agencies on vessel design and other construction details. The proposed 50-foot craft, to be provided with space for 4 persons (including 2 scientists), will be equipped to conduct underwater explorations to a maximum depth of 1,500 meters (4,920 feet). In terms of benefits to the fisheries, the research craft is expected to contribute knowledge heretofore unobtainable on the ecology, behavior, distribution, and migration of deep-water fish, and on oceanographic conditions. (Suisan Keizai Shimbun, January 21, 1966.)

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RATIFICATION OF TWO
GENEVA CONVENTIONS EXPECTED:

The Japanese Foreign Ministry and the Fisheries Agency were planning on presenting to the Diet, which convened in late January 1966, bills on ratification of two conventions adopted at the 1958 Geneva United Nations Law of the Sea Conference. The two are: Convention of the Territorial Sea and the Contiguous Zone; and Convention on the High Seas. This move to seek ratification of the two Conventions marks a new departure in Japan's fishery policy in that, until recently, Japan had strictly adhered to the principle of the three-mile territorial sea limit and the principle of freedom of the seas. However, as a result of the most recent development wherein Japan accepted the principles of the Geneva Conventions in defining fishery zones in the Japan-Republic of Korea fishery agreement (which took effect following ratification of the treaty to normalize relations between the two countries), it is reported that the Japanese Government decided to defend Japan's rights on the seas in the future on the basis of the principles embodied in the two conventions. (Japan Economic Journal, January 18, 1966.)



Republic of Korea

SHIPBUILDING MISSION FROM JAPAN VISITS KOREA:

The Cooperative Association of Japan Shipbuilders was scheduled in January 1966, to send a mission of some 15 shipbuilding technicians to South Korea for talks on Japan's cooperation in building fishing vessels under the treaty of economic cooperation recently concluded by the two countries.

The Japanese Association is a group of shipbuilders of small and medium size vessels. The mission, comprising experts of major member companies of the Association, was scheduled to stay in Korea for about 2 weeks and exchange views with Korean officials and leaders of the fishing industry on technical and business matters. (*The Japan Economic Journal*, Vol. 4, No. 159, January 11, 1966.)



Mexico

SHRIMP EXPORTS, 1965:

Mexican exports of shrimp in 1965 fell slightly below 1964, according to preliminary figures released by the Mexican Department of Statistics of the Secretariat of Industry and Commerce.

The 1965 value of shrimp exports was US\$44,112,000, down 1.7 percent from the 1964 figure of \$44,880,000, which in turn was down sharply from 1963. The above are Customs valuations. Re-evaluated figures of the Bank of Mexico, which reflect changes in actual market prices, show 1963 exports at \$51.7 million and 1964 at \$53.5 million. Prices continued high throughout most of 1965, and when re-evaluated figures are available they will probably show that 1965's somewhat lower quantity of exports will have about the same value as in 1964.

Shrimp constituted Mexico's fifth most important export in 1965, behind the perennial leaders--cotton, coffee, and sugar--and for the first time behind corn which was in second place. (U. S. Embassy, Mexico, D.F., Feb. 10, 1966.)



Morocco

ATLANTIC TUNA FISHERIES:

With the exception of tuna caught in the "madragues," or fixed nets, off the northwest coast of Morocco, and the canneries dependent on that catch, the local tuna catch is made by sardine boats and packed as a sideline by the sardine canneries. Since the local tuna industry is an offshoot of the much larger sardine industry, it is difficult to obtain precise information on the number and types of vessels used and areas where the fish are caught.

In the five "madragues" located offshore near Larache (two), Mehdia, Acila, and Tangier, bluefin tuna (*Thunnus thynnus*) are caught during May, June, and July. In 1964, a total of 4,700 tons of mainly bluefin were caught in the "madragues." This catch is sometimes not included in official Moroccan fishing statistics. Other varieties of tuna and tuna-like fish in Moroccan waters (such as bonito, frigate mackerel, swordfish, skipjack tuna, and some bluefin tuna) are caught in small quantities up to 50 miles off the coast from Tangier south to Agadir during the months of June through November. Most of those varieties are caught by sardine vessels using purse seines, but some of the larger fish are caught by hand lines from smaller boats. It is estimated that up to 50 sardine vessels in the 30- to 50-ton class engage in tuna fishing at some time during any given season either when sardines are not available or when the tuna are particularly in evidence. As far as is known there are no plans to build or buy any tuna vessels.

There are six canneries located in Tangier (two), Larache (three), and Kenitra which can tuna exclusively, mainly from the "madragues" with additional supplies trucked in from the southern ports, and 61 other canneries located in Mohamedia, Casablanca, El Jadida, Safi, Essouira, and Agadir which pack tuna as well as their main product sardines. During the 1964/65 season the 67 canneries packed 212,000 cases of tuna (about 39 lbs. per case). During the same season Moroccan canneries packed over 2.3 million cases of sardines and other fish. The capacity for tuna could thus be easily expanded if the supply warranted it since most plants can tuna only as a sideline.

Since the end of the Danguy charter in September 1965, there have been no significant research projects on tuna carried out by

Morocco (Contd.):

either the Government or private industry. The experience of the small Agadir vessels which fished off West Africa in 1965 reemphasized the fact long known to the local industry that larger more modern vessels are needed if the local fishermen are going to venture far from their own shores. (United States Embassy, Rabat, January 28, 1966.)



Norway

HERRING FACTORYSHIP TO OPERATE IN 1966:

A Norwegian whaling vessel will be converted to operate as a floating herring factory in 1966. The vessel will operate in the Skagerrak Sea, North Sea, or adjacent waters according to the supply of herring. The Norwegian herring catch in the North Sea increased greatly in 1965. Plans to build herring plants in southern Norway have also been discussed. At present, herring vessels working in the more southern waters must travel a considerable distance to deliver to factories in west Norway.



Peru

PERUVIAN FISH MEAL INDUSTRY TRENDS IN 1965, AND FUTURE PROSPECTS FOR 1966:

Peruvian production of fish meal in 1965 dropped to 1,282,011 metric tons, compared to 1,522,214 tons in the record year of 1964. The smaller production was due largely to a drop in the catch of anchovy estimated at about 8 million metric tons in 1965 as against 8.86 million tons in 1964. The amount of fish meal exported by Peru in 1965 was 1,259,417 tons, a decrease of 157,124 tons from 1964.

The Government of Peru has adopted conservation measures. A catch quota has been set of 7 million metric tons of anchovy for use in fish meal for the current open season, October 1, 1965-June 30, 1966. No anchovy fishing for the fish meal industry will be permitted in July, August, and September 1966. The opening of the next season has been set as October 1, 1966, but the closing date is to be selected later and is to be based on recommendations by the Peruvian Instituto del Mar.

Future prospects for the anchovy resource, the basis for the Peruvian fish meal industry, are giving cause for concern. September-December catches in 1965 showed as high as 60 percent immature anchovy, indicating the possibility of a reduced spawning stock associated with spawning season.

It is probable that the annual anchovy catch has reached its peak with the record year of 1964, and, typical of other commercial fisheries, may now begin to stabilize or decline, depending upon the effectiveness of conservation measures.

The reduced catch in 1965 resulted in serious economic hardship for some small fish meal firms operating with little reserve capital and heavily mortgaged equipment. Control of the industry by early 1966 appeared to be settling in the hands of a few large firms.

In addition to resource and economic problems, the industry faced political problems. Peruvian fishermen on a countrywide basis were threatening strikes if they did not obtain satisfaction on salaries, social advantages, and better working conditions. This could mean a minimum cost of US\$15.00 more per ton for Peruvian fish meal. Production of fish meal in January 1966 was estimated at about 210,000 tons maximum, or, about the same as in December 1965. U. S. buyers in late January 1966 were paying US\$183 per ton for February/March deliveries and US\$186 per ton for April/June deliveries. At the January rate of buying, U. S. buyers would have absorbed a minimum of 25,000 to 30,000 tons per month of Peruvian fish meal production for the period February through June.

Considering resource, economic, and political problems now being experienced by the Peruvian fish meal industry, the result could be higher world prices for fish meal and oil in 1966. It might be said, "As Peru goes, so goes the world fish meal market." (Various sources.)

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FISH OIL EXPORTS, JANUARY-SEPTEMBER 1964-1965:

Peruvian fish oil exports in the first 9 months of 1965 were 122,266 tons with a value of \$20.4 million, as compared with 90,531 tons valued at only \$11.3 million in the same period of 1964. (United States Embassy, Lima, January 9, 1966.)

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Peru (Contd.):

FISHING LICENSES FOR FOREIGN FLAG VESSELS:

The period of license validity for foreign flag vessels fishing for Peruvian companies was liberalized by Supreme Decree No. 16, dated December 28, 1965. Under the terms of the decree, licenses for such vessels will be valid to the end of the calendar year in which they are purchased. (U. S. Embassy, Lima, Peru, January 6, 1966.)



Poland

RECENT FISHERY DEVELOPMENTS:

Fishing Areas and Catches: Like other East European maritime nations, Poland has greatly expanded her marine fisheries. In 1964, her marine fishery landings were 244,000 metric tons, or three times as much as a decade ago. In the first half of 1965, landings amounted to 121,200 metric tons, but reportedly reached 280,000 tons by the end of the year (preliminary estimate). Most of the marine landings do not come from the Baltic Sea as they did in the first 15 years after World War II. In 1964, the Baltic contributed only about 80,000 tons of fish to the Polish catch; over 40 percent came from the North Sea (102,000 tons). The other two major Polish fishing grounds have been the Northwest Atlantic (almost 40,000 tons in 1964) and the area off Northwest Africa (15,000 tons). It was in those two areas that Polish fishing expanded most rapidly in recent years.

In the Northwest Atlantic Fisheries Convention (ICNAF) area, the Poles began to fish in 1961, mostly off the Canadian coast. On Georges Bank, fishing was limited in 1964; only 720 tons of fish were landed by one vessel. However, in August 1965, three Polish large stern trawlers (all newly built in 1964) began to fish on Georges Bank along with 2 Rumanian stern trawlers. It may be expected that the Poles will expand their fishing operations on Georges Bank, and will probably follow the Soviet expansion into the Southern Atlantic and eventually into the Indian Ocean.

Polish Fishing Fleet: Poland ranks third today in world construction of fishing vessels by tonnage (behind Japan and Sweden). Most of the new construction goes for export. Poland has been a major supplier of fishing

vessels to the Soviet Union, and in the last few years she began to export her fishing vessels also to France, United Kingdom, and other Western nations.

In January 1965, the Polish fishing fleet numbered about 700 motorized vessels, most of them small cutters (550 units). The rest consisted of large factory stern trawlers (10), factory freezer trawlers (10), medium trawlers (15), steam-powered trawlers (54), side trawlers (44), base ships (2), and supply ships (1). All factory and freezer stern trawlers were added in 1963 and 1964.

Plans for the Future: Poland has ambitious plans for the development of her distant fisheries. The landings are to double by 1970 (to 450,000 tons) mainly due to construction of about 35 large freezer and factory trawlers, 3 motherships, and 2 refrigerator vessels. Catches in the Baltic and North Sea will increase somewhat (to 100,000 and 120,000 tons), but the largest portion of the increased catch will come from the North and Central Atlantic (160,000 and 70,000 tons). Long-term plans provide for another doubling of the catch to 900,000 tons by 1980.

State Versus Private Enterprises: The Polish fishing industry consists of state, private, and cooperative enterprises. The state-owned and controlled fishing enterprises almost doubled their catch from 1961 to 1964 (see table 1), while private fishermen in 1964

Table 1 - Poland's Fishery Landings by Enterprises, 1961 and 1964

Fishery Enterprises	Quantity	
	1964	1961
	. (1,000 Metric Tons) .	
State enterprises	211.0	132.0
Cooperative enterprises	21.0	19.0
Private enterprises	21.0	18.0
Total Landings	244.0	169.0

Source: Polish Maritime News

landed less than 5 percent of the total catch. Government support in investments, research, modern equipment, and fishermen's training contributed to the rapid growth of state-owned enterprise fishing at the expense of private and cooperative enterprises.

Fishery Trade: Both Polish fishery exports and imports doubled from 1960-1964 (table 2). The most significant trends in imports are continuous increases in fish meal imports and the decline of salted herring imports from the Soviet Union. The entire increase in Polish fishery exports was due to the newly developed markets for fresh and

Poland (Contd.):

Table 2 - Poland's Fishery Trade, 1960 and 1964		
	1964	1960
	... (Metric Tons) ...	
Imports:		
Mackerel, frozen	1,450	-
Herring, fresh & frozen	5,583	4,014
Herring, salted	6,490	19,681
Fish fillets	-	1,419
Canned fish	2,069	6,141
Caviar	10	10
Fish meal	55,700	6,406
Total	71,302	37,671
Exports:		
Salmon	209	216
Marine fish	5,559	-
Fresh-water fish	1,403	1,398
Fish, smoked	236	6
Fish, salted	40	2,125
Canned fish	3,695	2,807
Crayfish	20	30
Total	11,162	6,582

Source: Polish Maritime News

frozen marine fish in West African countries, particularly in Liberia, Nigeria, and Ghana. Polish trawlers deliver fish directly from the fishing grounds to local ports. Canned fish exports have also increased greatly; in 1964 Poland exported highly diversified, attractively packed canned goods to more than 30 countries. Canned fishery imports decreased by two-thirds during 1961-1964. Poles now import only canned sardines in oil, a product greatly in demand but not produced domestically.

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POLISH FISHERIES ATTACHE IN GHANA:

Poland is reported to have a fisheries attache in Accra, Ghana. Polish vessels operating off West Africa sell fish directly in ports of Liberia, Nigeria, and Ghana. Those deliveries helped raise Polish exports of fresh and frozen fish to 5,600 metric tons in 1964.



Portugal

CANNED FISH EXPORTS,
JANUARY-SEPTEMBER 1965:

Portugal's total exports of canned fish in oil or sauce during the first 9 months of 1965 were up 14 percent from the same period of 1964, due mainly to larger shipments of sardines and mackerel. Sardines accounted for 75 percent of the total canned fish exports in January-September 1965.

Portugal's principal canned fish buyers during the first 9 months of 1965 were Germany with 11,280 metric tons, Italy 9,287 tons,

Portuguese Canned Fish Exports, January-September 1964-1965				
Product	1965		1964	
	Jan.-Sept.		Jan.-Sept.	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	40,747	2,144	37,149	1,955
Chinchards	1,935	102	2,612	137
Mackerel	6,530	261	3,478	139
Tuna & tunalike	2,231	74	1,444	48
Anchovy fillets	2,367	237	2,340	234
Others	572	30	529	27
Total	54,382	2,848	47,552	2,540

the United Kingdom 5,697 tons, France 4,171 tons, the United States 4,090 tons, and Belgium-Luxembourg 3,546 tons. Italy's purchases of canned fish from Portugal in January-September 1965 were almost double those in the same period of 1964, and purchases by Germany were up 25 percent. But purchases by the United Kingdom were down 18 percent. (Conservas de Peixe, November 1965.)

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CANNED FISH PACK,
JANUARY-SEPTEMBER 1965:

The Portuguese pack of canned fish in oil or sauce in the first 9 months of 1965 showed some increase (by weight) over the pack in

Portuguese Canned Fish Pack, January-September 1964-1965				
Product	1965		1964	
	Jan.-Sept.		Jan.-Sept.	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	26,815	1,141	34,177	1,799
Chinchards	2,072	109	1,356	71
Mackerel	11,147	446	3,375	135
Tuna & tunalike	6,324	211	4,708	157
Anchovy fillets	3,028	303	2,085	208
Others	1,599	84	534	28
Total	50,985	2,294	46,235	2,398

the same period of 1964 due mainly to a sharp gain in the pack of mackerel. But the important sardine pack was down. (Conservas de Peixe, November 1965.)



Rumania

LANDINGS AND FISHERY TRENDS, 1965:

Rumanian state-owned fishery enterprises landed 44,250 metric tons of fish in 1965 or 37 percent more than in 1964 when 32,404 tons (landed weight) were produced. United

Rumania (Contd.):

States Embassy, Bucharest, February 18, 1966.)

Editor's Note: Until 1964 more than two-thirds of the Rumanian catch consisted of fresh-water species; however, much of the 1965 increase of over 10,000 tons probably came from high-seas fishing. Rumania bought two large stern trawlers from Japan in 1964 and has been fishing off Africa's coast and in the Northwest Atlantic.

**Senegal****FISHERIES DEVELOPMENT PROJECT:**

The United Nations recently approved the following Special Fund project to aid fisheries in Senegal:

Fisheries development project, prospecting and development of sea fishing resources; fund allocation: \$773,000; recipient government contribution: \$668,000; duration: 5 years; executing agency: Food and Agriculture Organization. (United States Embassy, Dakar, February 1, 1966.)

**Sierra Leone****ATLANTIC TUNA FISHERIES:**

Following is a summary of tuna fishing activities off Sierra Leone:

The main tuna fishing areas off Sierra Leone for bait boats is in the triangle 9° N. 15° W., 12° N. 17°30' W., 10° N. 17° W. In 1965, many vessels fished along the edge of the shelf around Cape Palmas. Long-liners travel as far south as Ascension Island.

Four fishing methods are in use: (a) bait fishing from racks, (b) bait fishing with overhead pulleys, (c) long-lining, (d) combination purse-seine and bait (rack) fishing. No purse-seiners were seen in early 1966.

In 1964/65, tuna fishing off Sierra Leone was conducted by some 45 Spanish (Bermeo) vessels 90 feet long and 6 Japanese 120-ft. combination bait long-liners, with occasional visits from 3 or 4 French bait boats (80 ft.)

and two new Spanish bait-seiners. Fishing activity has declined recently, and in early 1966 the only tuna vessels in the area were 6 Spanish bait seiners and 4 Japanese vessels.

Sierra Leone's only shore facilities for tuna are in Freetown. They consist of 120 feet of dock with 14 feet of water depth and two jetties; 2,500 tons of cold-storage space; brine tanks for freezing; and 70-ton flake and block ice capacity. There is a pilot cannery.

Plans are under consideration for the extension of frontage, mainly to allow vessels other than tuna vessels to operate from the same base. (United States Embassy, Freetown, February 10, 1966.)

**South Africa Republic****ATLANTIC TUNA FISHERIES SITUATION:**

From a short survey of the current status of the tuna industry in South Africa, two factors emerge immediately: (1) Tuna fishing, which went through a modest boom period in 1963 and 1964, dropped off sharply in the latter part of 1964. According to an industry spokesman, there has been no commercial tuna fishing by firms in the South Africa Republic since that time. (2) Coincidentally with the fall-off in commercial tuna fishing, South African research on the incidence and habits of the tuna and in methods and extent of tuna fishing has virtually ceased.

Preliminary research conducted by the South Africa Republic Division of Sea Fisheries in 1960 and 1961 revealed the presence of four species of tuna off the Cape west coast: bluefin, yellowfin, big-eyed, and longfin. During the period of research, bluefin and big-eyed tuna occurred in greater numbers during the winter and spring (approximately June to December), whereas longfin and yellowfin tuna were most abundant during spring and autumn (October to December and March to June). Since that time, however, according to commercial and research sources, the movements and incidence of tuna shoals have varied widely, contributing to the industry's problems in mounting successful commercial tuna fishing operations and to reluctance to devote large resources to this type of fishing. Indeed, the Division of Sea Fisheries' Investigational Report No. 47, issued in November 1963, concluded that "too little is known of the long-

South Africa Republic (Contd.):

term pattern of occurrence of the fish to be certain that they will always be present in sufficient numbers to justify commercial operations."

A spokesman for the largest single operator in tuna fishing stated that his company, which entered the field in 1961, ceased tuna operations completely in 1964. By that time, the tuna "seemed to disperse" and tuna fishing had become economically not feasible.

All tuna fishing is thought to have been done by means of long-line gear. An experiment in purse-seine fishing, conducted by the Fisheries Development Corporation (in cooperation with the Division of Sea Fisheries and the fishing industry), from July 1962 to August 1963, produced discouraging results. Very few catchable schools of tuna were encountered, and the fish consistently managed to avoid netting by sounding. In addition, adverse weather conditions severely hampered fishing operations for 130 out of the 218 days in which the experimental ship was operative.

According to the best information available, the ships engaged in tuna fishing included about 40 wooden vessels, varying from 55-72 feet in length, and six 120-150-foot refrigerated steel vessels. Many of these apparently operated on a part-time basis: i.e., they were used for tuna fishing during the off-season months for the pilchard and anchovy industry. Two of the larger vessels, the Marinette (a 110-foot vessel owned by a recently liquidated firm) and the Beau Gest, built by a shipyard in Durban engaged in tuna fishing only briefly. Fishing industry experts in South Africa point to the unfortunate saga of that one firm as an example of the extreme hazards and uncertainty of tuna fishing under present conditions. The firm, formed in 1963, planned to utilize the Marinette as a "mothership," with a flotilla of approximately 8-10 smaller vessels carrying out actual fishing operations. In any event, only the Marinette ever engaged in tuna fishing, which proved unprofitable. The firm, meanwhile, ordered the construction of four or five 300-ton tuna vessels by the shipyard in Durban. The first was completed in June 1965 and subsequently sold in the yard in the wake of the firm's collapse. It is not known for what purpose the vessel will now be used.

Virtually all tuna caught in South African coastal waters was frozen whole and export-

ed. One company dominated the field, although tuna fishing was of considerably less importance in the operations of this company than the more profitable pelagic fishing and fish processing. This company maintains refrigeration facilities at Table Bay, which are now utilized for processing other types of fish. In general, processing facilities now used for pelagic or deep-sea fish could be converted to handle tuna.

No research directly related to the tuna industry is in progress currently. Two earlier research efforts, mentioned above, resulted in printed reports (A Preliminary Report on South African West Coast Tuna, Division of Sea Fisheries Investigational Report No. 47, 1963; and Purse Seine Netting for Tuna in S. A. Waters, by the General Manager of the Fisheries Development Corporation), which appeared in The South African Shipping News and Fishing Industry Review, January 1964. The results of research conducted subsequent to those two reports have not been prepared for publication. (United States Consulate, Cape Town, February 3, 1966.)



South-West Africa

PILCHARD SEASON STARTED JANUARY 31, 1966:

The 1966 pilchard fishing season in the Walvis Bay area of South-West Africa started on January 31, 1966. Of the seven plants in Walvis Bay, one started operating on January 31. Five of the remaining plants were scheduled to start at different times during February. One plant, undergoing extensive rebuilding, was not scheduled to open until late March or early April. (Namib Times, January 14, 1966.)



Spain

FREEZER-TRAWLER FLEET GROWING RAPIDLY:

In 2 years the Spanish freezer trawler fleet is expected to number 97 vessels and produce about 315,000 metric tons of frozen fish annually, according to a Danish report. The Spanish freezer trawler fleet has grown from 3 vessels in 1961 to over 40 vessels in 1965. Landings from the Spanish freezer fleet

Spain (Contd.):

were expected to total 105,000 metric tons in 1965.

**Taiwan****LANDINGS IN 1965:**

Taiwan's fishery landings (including marine, freshwater, and fish culture production) in 1965 totaled about 377,000 metric tons or approximately the same as in 1964, when 376,400 tons were produced. The total fish production goal for 1965 was set at 388,000 tons under Taiwan's 4-Year Development Plan. The failure to attain this goal was due to several unusually severe typhoons which hampered fishing operations, and changes in the migration patterns of offshore pelagic species. However, the 17 new tuna fishing vessels purchased with International Bank for Reconstruction and Development financing are now operational and will help to contribute to Taiwan's fisheries output. (United States Embassy, Taiwan, January 29, 1966.)

Note: See Commercial Fisheries Review, July 1964, p. 93.

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TUNA FISHING OFF SOUTH AFRICA:

Three trawlers from Taiwan arrived in Cape Town in late 1965 to start tuna fishing off the Cape. They planned to spend about a year off the west coast of South Africa. Later they may operate as far north as the coast of South-West Africa where Japanese and Israeli vessels are also fishing for tuna. (Namib Times, December 17, 1965.)

**Trinidad and Tobago****TUNA FISHERIES, 1965:**

The tuna fisheries of Trinidad and Tobago are not indigenous. Rather, Trinidad is used as one of a string of bases in the Atlantic by the Japanese tuna fishing fleet. Port-of-Spain is used primarily as a transshipment point, although of course, bunkering and procurement of supplies is effected as needed. The total Japanese Atlantic tuna fleet consisted of some 200 boats two years ago, but has now dropped to about half that number because of declining catches.

Up until a couple of years ago, the Atlantic tuna fishing grounds were apparently fairly well established and known to all in the trade. About 80 percent of the catches brought into Port-of-Spain then consisted of albacore and big-eyed. Albacore was caught in the Caribbean-West Indies area, big-eyed off the coast of Africa (Freetown, Dakar area), and both of those off Brazil. Of late, however, because of falling catches there have been no fixed grounds. The fishermen have had to search for tuna, and the composition of catches has been quite erratic. The varieties caught and brought to Port-of-Spain include albacore, yellowfin, big-eyed, a tuna-type fish called black marlin (which may be blackfin), straight marlin, small quantities of bonito and swordfish, kingfish, and sailfish.

All of the fishing done by the Japanese vessels is long-line fishing.

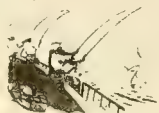
The Japanese boats using Trinidad as a base are the regular small-sized Japanese long-line tuna fishing vessels, i.e., 250-300 tons. Some 23 vessels are presently operating fairly regularly out of Port-of-Spain, although other vessels do call at irregular intervals as they cruise around the Atlantic. There is no local construction of tuna vessels in Trinidad and none contemplated.

The largest user of local facilities is a Japanese company. This group has arrangements to use in-bond cold storage and landing facilities owned by a local firm. Space in these cold storage rooms for about 1,400 tons of tuna is presently allocated for this purpose, and the tuna is re-exported to destinations such as the United States (albacore and yellowfin), Japan (marlin, black marlin and bluefin), and neighboring areas such as Venezuela, Barbados, Dominica and Martinique. There is no special technology used, handling is by means of forklifts, forklift baskets and hand labor; and there are no plans for expansion of facilities used only for tuna since the catch is down.

About three Japanese tuna boats from other companies use the services of other local shipping agents fairly regularly, but these transship directly from trawler to ship without the catches coming ashore. Port-of-Spain is a major port with bunkering facilities, boatyards, etc. Additional general purpose facilities such as cold-storage space can presumably be made available for tuna fisheries usage should the demand arise.

Trinidad and Tobago (Contd.):

There is no research being conducted by the local Government in the field of tuna. The U. S. Department of the Interior's Bureau of Commercial Fisheries is providing professional assistance for a U. N. Special Fund regional survey of Caribbean fishing grounds, aimed at developing the (general) fishing industry in the area. However, the activities of a Japanese Government survey boat, which recently passed through Port-of-Spain, are apparently focused much more directly on tuna. (United States Embassy, Port-of-Spain, January 27, 1966.)



Tunisia

MEDITERRANEAN TUNA FISHERIES:

Only one species of tuna is fished by Tunisia--bluefin (*Thunnus thynnus*). It is caught along the northeast coast during the months of July and August while the tuna is moving toward Sicily to spawn.

The tuna is caught with tuna nets ("madragues") fixed in place at the beginning of the season. They are composed of a series of nets spread out over several miles along the coast to a depth of 115-131 feet. Four "madragues" are in use and are the property of the Tunisia National Fisheries Office.

This method precludes the use of vessels in the actual fishing process. However, wooden barges or lighters are used to collect the fish from the nets. Eventually the Office hopes to acquire vessels capable of operating in the Atlantic in order to fish yellowfin and albacore tuna.

There are two canneries presently processing tuna in Tunisia. The larger of the two is at Sidi-Daoud and the other is in Mahdia. They employ modern equipment and have a total capacity of 40 metric tons of fish a day. The tuna is canned both in olive oil and in natural juices for home consumption and export, mainly to France.

Frozen tuna is occasionally imported from Norway and Japan for canning and later exported to Europe.

No extensive biological or technical research is presently underway. Some tagging

of tuna for tracking purposes was begun by the Oceanographic Institute of the Tunisian Government in May 1965. (United States Embassy, Tunis, February 10, 1966.)



U.S.S.R.

FISHERY LANDING TRENDS IN 1964-1965, AND OUTLOOK FOR 1966-1970:

The preliminary draft of the Soviet 5-Year Plan for the development of the fishing industry in 1966-1970 provides for a 50-percent increase over the 1965 fishery landings by 1970 so that total fishery production in 1970 should reach 8.5 million metric tons. Of this, 7.8 million tons is estimated to be fish catches, and the rest whales, marine animals, and other aquatic products. Most of the fish are expected to be caught on the high seas.

In 1964, the Soviet Union caught 5,121,000 metric tons of aquatic products. According to Food and Agriculture Organization (FAO) statistics, the Soviet marine and fresh-water fish catch in that year amounted to 4,475,000 metric tons, indicating that the almost 650,000 metric tons of other catches represented were whales, marine animals, and other marine products. It is interesting to note that the greatest increase in landings under the new plan is expected to come in the fish catch. The catch of whales and other marine mammals may even decrease somewhat, but may be compensated for by increased catches of other marine products, especially seaweed. In any event, the nonfish Soviet landings are expected to remain static during the next 5 years, amounting to about 700,000 metric tons in 1970.

During 1965, Soviet spokesmen repeatedly mentioned 10 million metric tons of fishery landings as the goal for 1970. This has now been scaled down to 8.5 million tons.

On December 24, the 1965 Soviet catch goal of 5.6 million metric tons of fish, shellfish, whales, marine mammals, and other marine products was attained. The 1965 catch was 10 percent greater than the 1964 catch of 5.1 million tons. A 10-percent increase is also planned for 1966 when total U.S.S.R. landings should reach 6.2 million metric tons. If the present rate of increase continues, the U.S.S.R. by 1967 or 1968 could become the leading fishing nation in the world. (The Fish-

U.S.S.R. (Contd.):

ing News, November 1965, and other sources.)

INDIAN OCEAN FISHERY TRENDS:

Indian Ocean operations of the Soviet fishing fleet are expected to be greatly increased during the next 5 years. By 1970, the Soviets plan to catch 190,000 metric tons in that area; much of the catch may consist of tuna. Soviets began large-scale fishing operations in the Indian Ocean in 1964-1965. By 1964, they had developed a successful Indian Ocean shrimp fishery, and in 1965 they began tuna fishing in the area with Japanese-built factoryships. Total landings from that area, however, were small. Most of the Soviet vessels come from Black Sea ports through the Suez canal, but their exact number is unknown.

FISHING FLEET EXPANSION
PLANNED FOR 1966-1970:

The Soviet Union plans to add 1,500 vessels to her fishing fleet during the 5-Year Plan (1966-1970). Most of those will be built in domestic shipyards, but foreign purchases (especially from Eastern Europe) will also be numerous. The additions will consist of 13 different classes. Among the larger types of vessels, the following planned additions are known: 150 large stern freezer trawlers (Maikovskii class from U.S.S.R. and Kosmos class from Poland), 100 large tropical stern trawlers (Tropik class from East Germany), a 40,000-gross-ton giant fishing mothership (Vostok class, now being built at Leningrad), 145 refrigerated fish carriers (many purchased in Western Europe), undetermined number of floating fish factories (U.S.S.R., West German, and Japanese construction), and others. Soviets admit that "there is not enough room" on existing fishing grounds for all of these vessels, and say the only way to successfully use the new additions is for them "to conquer new, unexploited fishing grounds." Most of these would be in the South Atlantic, South Pacific, and Indian Ocean. During the next 5 years, there probably will be increased Soviet fishery research effort, increased pressure on world fishery resources, and more joint Soviet enterprises with other nations.

NEW JAPANESE-BUILT FACTORYSHIP
FOR SOVIET PACIFIC FLEET:

The Japanese-built fish factoryship Spassk (18,000 gross tons) was turned over to the Soviet Union's Far Eastern fishing fleet in January 1966. The vessel has refrigerated holds with a capacity of 14,300 cubic meters. Plans call for a total of 8 vessels of this class to be built at a Yokohama shipyard for the U.S.S.R. by the end of 1966. It is believed that they will all operate in the North Pacific Ocean and Bering Sea.

FISHERIES AIDED BY GROWING
FLEET OF TRANSPORT VESSELS:

The Soviet Far Eastern Fisheries Administration had a total of about 100 refrigerated fish carriers and other fish transports in service as of January 1, 1966, in the Pacific Ocean and Bering Sea. In January 1959, less than 50 Soviet fish transports were available in the Far East. The total number of U.S.S.R. fish carriers at the end of 1964 exceeded 300 units.

FREEZER-TRAWLER "PAVLOVO"
DELIVERED TO SOVIETS BY
DANISH SHIPYARD:

The freezer-trawler M/S Pavlovo was delivered to V/O Sudoimport, Moscow, January 7, 1966, by a Copenhagen shipyard. The ves-



The M/S Pavlovo, a freezership which can also be used as a stern trawler.

sel is one of a series of freezer trawlers for the U.S.S.R. being built by the Danish shipyard to the following specifications: length

U.S.S.R. (Contd.):

between perpendiculars 91 meters (298.5 feet), breadth 16 meters (52.5 feet), and deadweight tonnage 2,550 to 2,600 metric tons. The first in the series was the M/S Skryplev launched May 10, 1962.

The M/S Pavlovo is reported to be equipped with butchering lines to head and gut fish and airblast freezers to freeze dressed fish in blocks in metal pans. The vessel may receive fish from accompanying trawlers, or it may operate as a stern trawler itself. Speed on loaded trials was 14.0 knots. (Assistant Regional Fisheries Attache, United States Embassy, Copenhagen, January 19, 1966.)

Note: See Commercial Fisheries Review, Sept. 1965 p. 76.

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NORTH ATLANTIC STUDIES
OF OCEAN PERCH:

The Soviet fishery and oceanographic research vessel Neptun left her home port of Murmansk in late January 1966 for a research cruise in the areas southwest and west of Iceland. The purpose of the cruise was to investigate large ocean perch schools believed by Soviet biologists to inhabit those waters, and to test new fishing gear. The vessel belongs to the Soviet Polar Institute of Marine Fisheries and Oceanography (PINRO) of Murmansk.

* * * * *

POLLOCK FISHERY IN WESTERN PACIFIC:

In early February 1966, over 100 Soviet seiners and trawlers from the Kamchatka, Sakhalin, and Primorskii Krai Fishery Administrations were fishing for walleye pollock (Theragra chalcogramma) in the Sea of Okhotsk off Kamchatka's west coasts. In 1964, the U.S.S.R. landed 213,600 metric tons of walleye pollock (also known as Alaska pollock); in 1966, the Soviets plan to catch over 300,000 tons by late spring. The Soviets sell some pollock to the Japanese directly in the fishing area. In addition to direct deliveries aboard Japanese fish meal factoryships (45,000 metric tons in 1966), the Soviets export walleye pollock to other Asian countries. Most of Soviet domestic pollock landings are reduced into fish meal; vitaminized medicinal fishoil is also produced from it.

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OCEANOGRAPHIC RESEARCH
IN THE SOUTHERN PACIFIC:

The Soviet oceanographic vessel Vitiaz stopped briefly in the Japanese port of Nagasaki in mid-February 1966 before sailing for southern Pacific waters where research was to be conducted by a party of oceanographers from the U.S.S.R. Academy of Sciences. From December 1965 to February 1966, the vessel had participated in a study of the Kuroshio Current off Japan.



United Arab Republic

FISHING FLEET EXPANSION
WITH SOVIET AID PLANNED:

Plans of the United Arab Republic to buy Soviet vessels and begin high seas fishing were announced to the Egyptian National Assembly February 12, 1966, by a Deputy Premier. Although the type of vessels to be purchased was not announced, it is thought that they may be large stern trawlers such as the U.S.S.R. recently also began exporting to Greece.

United Kingdom

INTERNATIONAL FOOD FAIR
AT MANCHESTER:

An international food fair will be held in Manchester, England, May 10-21, 1966.

In 1965, the Manchester fair, a major food fair in the English industrial Midlands, attracted 14,000 grocery operators and approximately 44,000 other tradesmen. This year the exhibit will feature a trade area, demonstration kitchen, and restaurant, and will be supplemented by an instore promotion in 1,000 retail outlets.

Each participating fishery firm at the fair will have display facilities equipped with shelves and a storage cabinet for sampling and promotional literature. Frozen products will be displayed in cases, furnished without charge, centrally located for common use by all exhibitors supplying frozen fishery products. Each participating firm will be required to provide a company representative or agent to attend its display full-time and to actively promote the company's branded products.

United Kingdom (Contd.):

United States firms were invited to participate in the Manchester fair. International food fairs offer an excellent opportunity to expand foreign trade.



Venezuela

TUNA FISHERIES, 1965:

The Venezuelan tuna fleet operates in the southeast Caribbean and western Atlantic between Trinidad and the Guianas. Generally speaking, fishing is confined in the Caribbean between longitudes 62° and 69° W. and latitudes 12° and 17° N. and in the Atlantic Ocean between 49° and 59° W. and 7° and 12° N. In the Caribbean zone the fishing effort is concentrated between 65° and 68° W. and 12° and 17° N. to the west of Las Aves submarine ridge and between 62° and 63° W. and 12° and 14° N. to the east of this ridge. There is little fishing over most of the ridge. The catch averages about 70 percent yellowfin, 20 percent albacore and 10 percent big-eyed tuna. Occasionally, a bluefin tuna is landed and a few marlin (aguja) and sharks (cazones) are captured. Fishing is year round.

Long-line fishing is the principal method of taking tuna. The largest vessel utilizes 400 baskets (5 hooks to the basket); a few boats work with 200 to 260 baskets; the majority of the fleet operates with 100 to 120 baskets; and a few of the smaller vessels carry less than 100 baskets. The sardine (*Sardinella*) is used as bait. The catch rates are placed at 1 to 8 percent for yellowfin and up to 2 percent for albacore.

Venezuela's tuna fleet consists of 3 long-liners of Japanese origin--one of 150 tons and two of about 50 tons each--and 43 small converted fishing craft (formerly used to fish red snapper). The small craft are 20 to 30 meters in length with capacity ranging from 7 to 30 tons. The Japanese long-liners operate with mixed crews. The small boats have a crew of 5 to 10 men--12 at the most--who often are a "family group." Some consideration is being given to acquisition of additional tuna vessels but no firm decisions have been reached. Boats being built in shipyards of the canneries are small. Venezuela has no commercial shipyards building fishing vessels, and facilities for maintaining the larger

tuna vessels are limited and expensive. Additions by conversion of small line-fishing boats to tuna long-liners can be expected, particularly in years of good tuna fishing. The same boats, however, will continue to occasionally engage in bottom long-lining for snapper and grouper.

Shore-based facilities are very limited at both Cumana and La Guaira for landing tuna. Six canneries are located in Cumana, one at Mariguitar, and one in Porlamar. The eight plants have a production capacity adequate to process the 12,000 tons considered to be the national market's potential. A Government development agency for some time has had under consideration the development of a fishing port in eastern Venezuela at Puerto de Hierro (Gulf side of the Paria Peninsula). No firm decision has been reached to date. There has been no technological improvements in handling tuna on shore. Technicians are trying to influence captains of the small tuna boats using ice to limit trips to three to five days duration.

In 1964, Venezuela's Center of Fisheries Investigation, with the backing of the National Fund of Agricultural Investigations, started a study program of its tuna industry in view of the rapid growth. The first task of the study was to establish basic parameters such as fleet size, overall catches, areas of fishing, etc. Log books were prepared and given to boat captains as a method of obtaining precise data on place and date of fishing, time of set, number of baskets and type of tuna with its estimated weight. The Center's program also included sampling of commercial catch for body dimensions, weight, gonad size and state, stomach contents, etc. These studies are to provide data for length-frequency and length-weight studies and for morphometric work. As very few boats have good refrigeration equipment, captains gut the catch at sea and very few whole fish are available for study. The program is limited to those measurements largely unaffected by gutting. Some captains do bring in gonads in plastic bags provided by the Center marked to correspond to the fish. The Center has equipment available for studies involving electrophoresis and chromatography. The Center's first report is under preparation. (United States Embassy, Caracas, Venezuela, January 28, 1966.)





FEDERAL ACTIONS



Department of Commerce

ECONOMIC DEVELOPMENT ADMINISTRATION

FEDERAL FUNDS TO AID REHABILITATION OF LAKE SUPERIOR FISHING INDUSTRY:

A technical assistance project to revive and diversify the Lake Superior commercial fishing industry, approved in December 1965, will provide about \$200,000 in Federal funds to carry out the program. The new Economic Development Administration, U. S. Department of Commerce, will contribute \$185,000, and the remainder will come from the Bureau of Commercial Fisheries, U. S. Department of the Interior.

The funds will be used to develop means for producing, processing, and marketing the various less-valuable Lake Superior species--herring, chub, smelt, and alewife. Trawling techniques will be tested for more economic production of those underutilized fish. The program also will include setting up a pilot-processing plant to produce and market new food items from the available species. Although the outlook for rehabilitation of the lake trout in Lake Superior is promising, for the short term and in order to broaden the economic base of the fishing industry, there is need for fuller utilization of the less desirable species which presently are in good supply.

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STUDY GRANT MAY LEAD TO FISH MEAL INDUSTRY IN TENNESSEE:

Approval of \$103,000 for a study on the feasibility of establishing a fish meal industry in Tennessee was announced February 14, 1966, by the Economic Development Administration (EDA) of the U. S. Department of Commerce.

The study will determine whether sufficient quantities of fish suitable for reduction to meal can be caught in the streams and res-

ervoirs of Tennessee to justify commercial harvesting and processing. The funds will provide for the year-long testing of various types of fishing gear and for laboratory analysis of the catch.

Operation of a large fish-meal plant would employ as many as 70 persons in economically depressed areas of Tennessee and also assure more regular employment for those already engaged in fishing.

The Economic Development Administration will furnish the \$103,000. Another \$24,000 will be supplied by the Tennessee Game and Fish Commission, which requested the study, the Tennessee Valley Authority, the University of Tennessee, and the Bureau of Commercial Fisheries, U. S. Department of the Interior, which will monitor the study and administer the technical assistance grant.

EDA was set up under the Public Works and Economic Development Act of 1965 which authorizes financial assistance to create permanent new jobs in those areas of the Nation suffering from high unemployment or low family income.

EDA's technical assistance program, which is financing the fish-meal study, helps provide information needed to spur economic growth. Other phases of the EDA program include financial assistance in the form of public works loans and grants, and loans.

If the results are favorable, the fish-meal study could have economic impact not only in Tennessee and its sister TVA states but also in Oklahoma, Arkansas, Missouri and other states with large bodies of fresh water.



Department of the Interior

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Leigh Sydney Wright, Box 8, Hoonah, Alaska 99829, for the purchase of a used 34.8-foot wood vessel to engage in the fishery for salmon. Notice of the application was published by the U. S. Department of the Interior's Bureau of Commercial Fisheries in the Federal Register, February 10, 1966.

Winfred D. Cole, P. O. Box 1239, Aransas Pass, Tex. 78336, for the purchase of a used 49-foot registered length wood vessel to engage in the fishery for shrimp. Notice of the application was published in the Federal Register, February 11, 1966.

James Joseph Mello, Hill Road, Snug Harbor, Wakefield, R. I. 02879, for the purchase of a used 80-foot vessel to engage in the fishery for lobsters, groundfish, flounders, and fish for industrial uses. Notice of the application was published in the Federal Register, February 12, 1966.

Robert James Leekley, Box 217, Petersburg, Alaska 99833, for the purchase of a used 43.7-foot registered length wood vessel to engage in the fishery for salmon, halibut, and black cod. Notice of the application was published in the Federal Register, February 15, 1966.

Robert Miles Barber, Route 2, Box 213, Coos Bay, Oreg. 97421, for the purchase of a used 32.8-foot registered length wood vessel to engage in the fishery for crab and miscellaneous species of edible fish. Notice of the application was published in the Federal Register, February 15, 1966.

Jack J. Childers, 1805 West Seventh St., Port Angeles, Wash., 98362, for the purchase of a used 40.6-foot registered length wood vessel to engage in the fishery for salmon, halibut, cod, and tuna. Notice of the application was published in the Federal Register, February 18, 1966.

Charles Roy Leshner and Phyllis A. Leshner, 335 West 12th St., Juneau, Alaska 99801, for the purchase of a used trolling vessel to engage in the fishery for salmon. Notice of the application was published in the Federal Register, February 22, 1966.

Thane B. Ohler, Box 691, Blaine, Wash. 98230, for the construction of a used 29.9-foot registered length vessel to engage in the fishery for salmon and Dungeness crab. Notice of the application was published in the Federal Register, February 24, 1966.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).

Note: See Commercial Fisheries Review, March 1966 p. 72.

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HEARING ON APPLICATION FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Victoria Fishing Corp., 136 Campbell St., New Bedford, Mass., has applied for a fishing vessel construction differential subsidy to aid in the construction of a 90.75-foot over-all wood vessel to engage in the fishery for groundfish, scallops, flounder, lobster, and swordfish.

A hearing on the economic aspects of this application was scheduled to be held. The U. S. Department of the Interior's Bureau of Commercial Fisheries published the notice of the application and hearing in the February 24, 1966, Federal Register.

* * * * *

REVISED U. S. STANDARDS FOR FROZEN RAW BREADED SHRIMP-- REQUIREMENTS FOR CONDITION OF COATING STILL BEING EVALUATED:

The revised U. S. Standards for Grades of Frozen Raw Breaded Shrimp are being phased in gradually. The effective date for the condition of coating factor was extended until February 7, 1966, to give the breaded shrimp industry an opportunity to submit data supporting their position for modification of the condition-of-coating factor.

A further extension of the effective date for the condition-of-coating factor was given to allow additional studies to be conducted. Accordingly, this factor shall become effective at the beginning of the 60th calendar day after February 7, 1966. The notice as it appeared in the Federal Register, February 16, 1966, follows:

Title 50—WILDLIFE AND FISHERIES

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBCHAPTER G—PROCESSED FISHERY PRODUCTS, PROCESSED PRODUCTS THEREOF, AND CERTAIN OTHER PROCESSED FOOD PRODUCTS

PART 262—U.S. STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP

On Tuesday, August 3, 1965, there was published in the FEDERAL REGISTER, pages 9644-9647, inclusive, Part 262—U.S. Standards for Grades of Frozen Raw Breaded Shrimp.

This part became effective September 2, 1965, except that the requirements for uniformity, degree of dehydration and condition of coating became effective December 1, 1965. On December 9, 1965, there was published in the FEDERAL REGISTER, page 15221, a notice extending the effective date for the condition of coating factor until February 7, 1966, to give the breaded shrimp industry an opportunity to submit data supporting their position for modification of the condition of coating factor.

As a result of a review of the data presented by the breaded shrimp industry, a further extension of the effective date for the condition of coating factor is given to allow additional studies to be conducted. Accordingly this factor shall become effective at the beginning of the 60th calendar day after February 7, 1966.

Breaded shrimp inspected and graded in accordance with the revised Part 262 as published in the August 3, 1965, FEDERAL REGISTER (30 F.R. 9644) between February 7, 1966, and April 8, 1966, shall meet the requirements for condition of coating as provided in Part 262—U.S. Grade Standards for Raw Breaded Shrimp and published in the FEDERAL REGISTER (25 F.R. 8444) dated September 1, 1960, as amended by interim regulations published on page 7444 of the FEDERAL REGISTER dated June 5, 1965.

HAROLD E. CROWTHER,
Acting Director.

FEBRUARY 10, 1966.

Note: See Commercial Fisheries Review, February 1966 p. 88.

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UDALL CONGRATULATES BUREAU ON ITS 95th ANNIVERSARY:

Secretary of the Interior Stewart L. Udall congratulated the Bureau of Commercial Fisheries, which observed its 95th anniversary in

February 1966. In a message to Donald L. McKernan, Bureau Director, Secretary Udall said:

"Please extend my best wishes to all employees of the Bureau of Commercial Fisheries--to those aboard exploratory vessels at sea, in the laboratories, and in offices here and abroad.

"Since the creation by Congress in 1871 of a one-man fisheries commission, the Bureau of Commercial Fisheries has made many notable contributions to the Nation and to all aspects of its fishing industry.

"The Department of the Interior is proud of the record established by the Bureau in science, technology and resource development. This has been done with the Bureau's primary mission always uppermost--service to the Nation and industry, without depleting the fishery resources."

Responding to Secretary Udall's message, Director McKernan said:

"The five years remaining until we observe our one-hundredth anniversary can be the most outstanding in the Bureau's history. Our scientists estimate that the harvest from the ocean waters near our coast can be increased fivefold. If our fishing industry can achieve this goal, it will provide an important economic benefit to the Nation, and help feed the hungry billions of the world. We fully expect the fish protein concentrate we have developed to be a large factor in helping combat malnutrition in developing countries.

"The Bureau has the human and technical resources to make the next five years memorable."



Department of the Treasury

BUREAU OF CUSTOMS

GROUND FISH FILLET IMPORT TARIFF-RATE QUOTA FOR 1966:

The reduced-tariff-rate import quota on fresh and frozen groundfish (cod, haddock, hake, pollock, cusk, and ocean perch) fillets and steaks for calendar year 1966 is 23,591,432 pounds, the Bureau of Customs announced in

the February 8, 1966, Federal Register. Divided into quarterly quotas this means that 5,897,858 pounds of groundfish fillets and steaks during each quarter of 1966 may be imported at the $1\frac{7}{8}$ cents-per-pound rate of duty and any imports over the quarterly quota will be dutiable at the rate of $2\frac{1}{2}$ cents a pound.

Reduced Tariff-Rate Import Quota for Fresh and Frozen Groundfish Fillets, 1954-1966			
Year	Quota 1,000 Lbs.	Year	Quota 1,000 Lbs.
1966	23,591	1960	36,533
1965	24,384	1959	36,920
1964	24,862	1958	35,892
1963	24,875	1957	37,376
1962	28,571	1956	35,197
1961	32,601	1955	35,433
		1954	33,950

The reduced-rate import quota for 1966 is 3.2 percent less than the 1965 quota of 24,383,589 pounds. From 1951 to 1960 the quantity of fresh and frozen groundfish fillets permitted to enter the United States at the reduced rate of duty of $1\frac{7}{8}$ cents a pound had increased 24.7 percent, but in 1961 the trend was reversed significantly for the first time because in 1960 frozen fish fillet blocks with bits and pieces were no longer dutiable under the Tariff category of "frozen groundfish fillets."

Average aggregate apparent annual consumption in the United States of fresh and frozen groundfish fillets and steaks (including the fillet blocks and slabs used in the manufacture of fish sticks, but excluding fish blocks since September 15, 1959, and blocks of fish bits) for the three years (1963-65) preceding 1966 was 157,276,216 pounds, calculated in accordance with headnote 1, Part 3A, Schedule 1, under item 110.50, of the Tariff Schedules of the United States. This was far below the consumption of 217,337,633 pounds in 1958-60 and 243,554,480 pounds for 1957-59.

The notice as it appeared in the Federal Register of February 8, 1966 follows:

DEPARTMENT OF THE TREASURY

Bureau of Customs

[T.D. 68-27]

TARIFF-RATE QUOTA FOR CERTAIN FISH

Calendar Year 1966

FEBRUARY 2, 1966.

In accordance with item 110.50 of part 3, schedule 1, Tariff Schedules of the United States, it has been ascertained that the average aggregate apparent annual consumption in the United States of fish, fresh, chilled, or frozen, fillets, steaks, and sticks, of cod, cusk, haddock,

hake, pollock, and rosefish, in the 3 years preceding 1966, calculated in the manner provided for in headnote 1, part 3A, schedule 1, was 157,276,216 pounds. The quantity of such fish that may be imported for consumption during the calendar year 1966 at the reduced rate of duty under item 110.50 is, therefore, 23,591,432 pounds.

[SEAL] EDWIN F. RAINS,
Acting Commissioner of Customs.

Note: See Commercial Fisheries Review, April 1965 p. 93.



Eighty-Ninth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.



ALASKAN SALMON FISHERY: Sen. Gruening inserted in Congressional Record, Feb. 25, 1966 (pp. 3969-3970), an article that appeared in the Feb. 1966 issue of Fishermen's News titled "Prince William Sound Earthquake Loss At \$1 Million--Spawning Bed Damage Threatening Current, Future Pink Salmon Runs," by Lone E. Janson. The article concerns the far-reaching devastation of the fisheries in Prince William Sound that occurred in the Alaska earthquake of March 1964.

ANTIDUMPING ACT AMENDMENT: Rep. Nedzi in extension of his remarks inserted in Congressional Record, Mar. 1, 1966 (pp. A1047-A1049), an article titled "Dumping, Antitrust Policy, and Economic Power," which will appear in a forthcoming issue of Business Topics. The article contains a discussion of the implications of proposed antidumping legislation.

CLEAN RIVERS RESTORATION ACT OF 1966: Introduced in House H. R. 13104 (Fallon), H. R. 13105 (Wright), H. R. 13147 (Howard), H. R. 13165 (McCarthy) Mar. 1, 1966; introduced in Senate S. 2987 Feb. 28, 1966, to provide a program of pollution control and abatement in selected river basins of the United States through comprehensive planning and financial assistance, as amended, and for other purposes; to Committee on Public Works. Same day both Houses received a letter from the Secretary of the Interior transmitting a draft of proposed legislation.

Rep. Fallon in Congressional Record, Feb. 28, 1966 (p. 4047), pointed out that this bill would provide for the cleaning up of our Nation's lakes, streams, rivers, and harbors on a wide-scale basis.

Sen. Muskie in Congressional Record, Feb. 28, 1966 (pp. 4057-4061), pointed out that there are three principal features in the administration bill; one provides

for the development of coordinated pollution control and abatement programs in selected river basins; the second is a tightening of enforcement procedures; and the third provides for some increase in Federal assistance for sewage treatment construction, an increase in Federal assistance in State pollution control programs, and an increase in the authorization for Federal water pollution control research.

COMMODITY PACKAGING AND LABELING: Introduced in House H. R. 12759 (Farnum), Feb. 10, 1966, and H. R. 12977 (Wm. D. Ford), Feb. 23, 1966, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling certain consumer commodities distributed in such commerce, and for other purposes; to Committee on Interstate and Foreign Commerce. Similar to S. 985.

FISHERIES: Sen. Bartlett inserted in Congressional Record, Feb. 10, 1966 (pp. 2825-2826), an article from the January 1966 anniversary issue of the Fishermen's News titled "High Seas Fishery Conservation--1965" by Sen. Warren G. Magnuson.

Rep. Sikes inserted in Congressional Record, Feb. 14, 1966 (pp. A713-A714), an article from the Jan. 31 issue of Sports Illustrated titled "Plenty of Fish In The Sea?" by Martin Kane.

Sen. Robertson, Congressional Record, Feb. 21, 1966 (pp. 3399-3400), spoke in the Senate regarding an article titled "Plenty of Fish In The Sea?" which appeared in the Jan. 31, 1966 issue of Sports Illustrated. He stated that he sent this article to the Secretary of the Interior, and today he inserted in the Record the reply to his letter from Deputy Director Abram V. Tunison of the Fish and Wildlife Service, Bureau of Sport Fisheries and Wildlife.

FISH HATCHERIES - OREGON: Senate Feb. 24, 1966, received a letter from the Acting Comptroller General of the United States, transmitting, pursuant to law, a report on review of cost-sharing arrangements with the State of Oregon for the operations of fish hatcheries, Bureau of Commercial Fisheries, U. S. Fish and Wildlife Service, Department of the Interior, dated Feb. 1966 (with accompanying report); to Committee on Government Operations.

FISH PROTEIN CONCENTRATE PLANTS: Sen. Bartlett, Congressional Record, Feb. 16, 1966 (pp. 2975-2976), spoke from the floor of the Senate concerning the National Academy of Sciences' endorsement and support of a fish protein concentrate as contained in his bill, S. 2720; and as mentioned in President Johnson's food-for-freedom message to Congress. He inserted in the Record a copy of the letter from Frederick Sertz, president of the National Academy of Sciences, dated Dec. 1, 1965, addressed to Secretary Udall on this matter; a copy of the resolution adopted by the Advisory Committee on Marine Protein Resource Development of the National Academy of Sciences, recommending the construction of a suitable pilot plant for fish protein concentrate; and the committee's statement concerning the commercial production of a wholesome protein concentrate made from whole fish for human consumption.

Sen. Kennedy (Mass.) spoke in the Senate (Congressional Record, Mar. 1, 1966, pp. 4157-4159) concerning the use of fish protein concentrate as a food supplement to alleviate world hunger. He listed the following as some

of the immediate advantages of full-scale production of FPC: would allow year-round fishing for fishermen; stabilize and diversify the fish market; increase employment in fish processing plants; and increase work for shipbuilders. The Senator proposed a six-point action program to insure that fish protein concentrate is put to work quickly and effectively as follows: (1) obtain approval by the Food and Drug Administration for the commercial marketing of FPC; (2) obtain passage of Sen. Bartlett's bill (S. 2720), providing for the construction of experimental plants to produce fish protein concentrate; (3) institute a series of technical studies, through authority already existing under present law, for the design of a processing plant small enough to be carried on board ship; (4) use resources of private industry in the behalf of FPC future research and exploitation; (5) establish a coordinating link between the Department of the Interior's Bureau of Commercial Fisheries and the Office of Economic Opportunity so that once FPC is approved by the FDA for domestic consumption, the product could be made immediately available in the war on poverty; and (6) include FPC in our food-for-freedom program.

Rep. Hanna in extension of remarks in Congressional Record, Mar. 1, 1966 (pp. 4237-4238), asked that his fellow members join him in urging swift and favorable action of the Food and Drug Administration on a Department of the Interior petition for clearance of fish protein concentrate as an acceptable food additive.

FUR SEAL CONSERVATION AND PRIBILOF ISLANDS ADMINISTRATION: The Senate Committee on Commerce, Feb. 18, 1966, resumed its hearings on S. 2102, to protect and conserve fur seals on the Pribilof Islands, having as a witness Donald F. McKernan, Director, Bureau of Commercial Fisheries, Department of the Interior. Hearings adjourned subject to call.

METRIC SYSTEM STUDY: House Committee on Science and Astronautics Feb. 17, 1966, reported (H. Rept. 1291) with amendment, S. 774, an act to authorize the Secretary of Commerce to make a study to determine the advantages and disadvantages of increased use of the metric system in the United States.

H. Rept. 1291, authorizing the Secretary of Commerce to make a study to determine the advantages and disadvantages of increased use of the metric system in the United States (Feb. 17, 1966, report from the Committee on Science and Astronautics, House of Representatives, 89th Congress, 2nd session, to accompany S. 774), 6 pp., printed. Committee reported bill favorably with an amendment. Discusses explanation of amendment, purpose and explanation of bill, cost and budget data, departmental recommendations; also presents the views of Rep. John W. Wylder.

The Metric Study Bill: Hearings before the Committee on Science and Astronautics, U. S. House of Representatives, 89th Congress, 2nd session, on S. 774, January 18, 1966, 11 pp., printed. Contains statement of Dr. J. Herbert Holloman, Assistant Secretary for Science and Technology, Department of Commerce, accompanied by Gordon Christenson, Assistant General Counsel.

OCEANOGRAPHY: Sen. Magnuson inserted in Congressional Record, Feb. 10, 1966 (pp. 2838-2839), a speech titled "Government and Industry--Partners in Oceanography," given on Jan. 27, 1966, by Rear Adm. O. D. Waters, Jr., oceanographer of the Navy, before the Ocean Science and Technology Advisory Committee and the Oceanography Subcommittee of the Antisubma-

rine Warfare Committee of the National Security Industrial Association.

SHRIMP: Rep. Edwards inserted in Congressional Record, Feb. 21, 1966 (p. A849), a recent Fish and Wildlife Service release titled "Shrimp Dishes Grow in Popularity." This article recognizes the growing shrimp industry and highlights the facts that southwest Alabama shrimpers are a major part of this growth.

TRADE EXPANSION ACT AMENDMENT: H. R. 12756 (Curtis) introduced in House Feb. 10, 1966, to amend the Trade Expansion Act of 1962 to provide that the President's annual report to Congress shall be submitted on or before March 31 of each year; to Committee on Ways and Means. Rep. Curtis pointed out in Congressional Record, Feb. 10, 1966 (p. 2707), that this amendment would make explicit the intent of Congress that it have available for reference and use early in each year the President's report on trade for the previous year. He stated that the trade report is not only an important document through which the Congress can judge the operations of the Executive in this important field, it is also necessary for congressional decision-making. He also stated that the trade report can be an important vehicle for public information, especially at present when U. S. international trade negotiations (Kennedy Round) are widely followed and the subject of public interest.

WATER POLLUTION: Hon. Blatnik inserted in Congressional Record, Feb. 17, 1966 (pp. A794-A796), a speech delivered Jan. 18, 1966, at the Clean Water Conference of the Michigan State Association of Supervisors, titled "Water Pollution in Michigan--A Way To Its Solution," by Hon. John Dingell.

Rep. Howard inserted in Congressional Record, Feb. 17, 1966 (pp. A832-A833), an address by Rep. Blatnik, Feb. 17, 1966, before the Midwest Governor's Conference, Lexington, Kentucky, titled "The Surge for Clean Water."

S. 2947 (Muskie and 17 others) introduced in Senate Feb. 18, 1966, to amend the Federal Water Pollution Control Act in order to improve and make more effective certain programs pursuant to such act; to Committee on Public Works. Sen. Muskie pointed out in Congressional Record, Feb. 18, 1966 (pp. 3310-3312), that the bill makes the following provisions: provides for a 6-year, \$6 billion program of grants to municipalities for sewage treatment construction cost; provides for incentives to the States to participate in the program by offering a 10-percent bonus on those grants in cases where the State matches the Federal contribution; provides for an increase from \$5 million to \$10 million in the grants for State programs; and authorizes a \$25 million a year program of grants for the demonstration of advanced waste treatment and water purification methods or new or improved methods of compatible joint treatment systems for municipal and industrial wastes.

Both Houses Feb. 23, 1966, received the President's message, transmitting legislative recommendations with respect to water and air pollution, parks and recreation, and other phases of natural resources. Among other things, the message contains a statement concerning the submission to the Congress of a reorganization plan to transfer to the Department of the Interior the Water Pollution Control Administration now housed in the Department of Health, Education, and Welfare. The text

of the message (H. Doc. 387) is printed in Congressional Record, Feb. 23, 1966 (pp. 3519-3522).

Rep. McCarthy in extension of his remarks inserted in Congressional Record, Mar. 1, 1966 (pp. A1065-A1066), an article which appeared in the Feb. 25 edition of the New York Times titled "The Clear Water Fight: President Casts Himself As Referee, Wielding A Big Carrot And A Big Stick," by Mr. Gladwin Hill.

H. R. 13162 (Dingell) and H. R. 13179 (Wright) introduced in House Mar. 1, 1966, to amend the Federal Water Pollution Control Act in order to improve and make more effective certain programs pursuant to such act; to Committee on Public Works.

H. R. 13235 (Resnick) introduced in House Mar. 2, 1966, to expand and improve existing law and to provide for the establishment of regulations for the purpose of controlling pollution from vessels and certain other sources in the Great Lakes and other navigable waters of the United States; to Committee on Merchant Marine and Fisheries. Similar to H. R. 7976.

WATER RESOURCES RESEARCH: The Subcommittee on Irrigation and Reclamation of the House Committee on Interior and Insular Affairs, Feb. 14, 1966, continued hearings on S. 22, and related bills, to promote a more adequate national program of water research. Hearings continued Feb. 15.

WORLD HUNGER--PRESIDENT'S MESSAGE ON FOOD FOR FREEDOM: Both Houses Feb. 10, 1966, received the President's message transmitting his legislative recommendations for worldwide war on hunger. At one point in his speech, in Congressional Record, Feb. 10, 1966 (pp. 2703-2709), the President stated that modern science must be directed to the fight against malnutrition and that he has directed the President's Science Advisory Committee to work with the very best talent in this Nation to search out new ways to develop inexpensive, high-quality synthetic foods as dietary supplements. He stated that "a promising start has already been made in isolating protein sources from fish, which are in plentiful supply throughout the world." The message was ordered printed as a House document (H. Doc. 378), and referred to the House Committee on Agriculture and the Senate Committee on Agriculture and Forestry.

H. Doc. 378, A War On Hunger: Message from the President of the United States relative to A War On Hunger, referred to Committee on Agriculture, House of Representatives, 89th Congress, 2nd Session, Feb. 10, 1966, 8 pp., printed.

H. R. 12785 (Cooley) introduced in House Feb. 14, 1966, to combat hunger and malnutrition, to further economic development and for other purposes; to Committee on Agriculture.

House Committee on Agriculture, Feb. 15, 1966, began hearings on the world population explosion and war on hunger program.

Senate Feb. 16, 1966, received a letter from the Acting Secretary of Agriculture, transmitting a draft of proposed legislation to promote international trade in agricultural commodities, to combat hunger and malnutrition, to further economic development, and for other purposes (with an accompanying paper); to Committee on Agriculture and Forestry.

S. 2933 (Ellender) introduced in Senate Feb. 17, 1966, to promote international trade in agricultural commod-

ities, to combat hunger and malnutrition, to further economic development, and for other purposes; to Committee on Agriculture and Forestry. Similar to H.R. 12785. Sen. Ellender speaking from the floor of the Senate stated that the above mentioned committee will begin hearings on this bill on Mar. 1, 1966. He inserted in Congressional Record, Feb. 17, 1966 (p. 3205), a short explanation of the bill which states that the bill authorizes a 5-year program for furnishing food aid abroad to replace Public Law 480 when it expires on Dec. 31, 1966.

Sen. Bartlett in Congressional Record, Feb. 18, 1966 (p. 3280), submitted an amendment (No. 485) to S. 2933, to promote international trade in agricultural commodities, to combat hunger and malnutrition, to further economic development, and for other purposes. The amendment adds domestic fishery products to the President's food-for-freedom program. Sen. Bartlett stated that he was pleased that the new food-for-freedom program is not dependent on our offering only surplus products to needy, friendly nations because this restriction has prevented fishery products from being sold under the food-for-peace program simply because the Secretary of the Interior never determined that any domestic fishery product was in surplus. He further stated that under the amendment the financing of fishery products would be the same as under the present law; namely CCC funds. He emphasized that fish protein concentrate is already included in the legislation since authority is in the bill to use CCC funds for the acquisition of additives and for the cost of enrichment and fortification.

Senate Committee on Agriculture and Forestry began hearings Mar. 2, 1966, on S. 2933.

Rep. Hanna in extension of his remarks inserted in Congressional Record, Feb. 21, 1966 (p. A868), an editorial from the Feb. 13, Los Angeles Times, titled "Food For Freedom and Survival."

Rep. Garmatz inserted in Congressional Record, Feb. 21, 1966 (p. A877), an editorial from the Baltimore Sun titled "Food Message."

Rep. Cooley in extension of his remarks inserted in Congressional Record, Feb. 23, 1966 (pp. A935-A939), the statement given by the Secretary of Agriculture at hearings before the House Committee on Agriculture.

Sen. McGovern inserted in Congressional Record, Mar. 1, 1966 (p. 4157), an editorial which appeared in the March issue of the Farm Journal, titled "Good Hunger Program." The editorial strongly endorses President Johnson's new food-for-freedom program.

Senate Committee on Agriculture and Forestry began hearings Mar. 2, 1966 on S. 2826, to amend the Agricultural Trade Development and Assistance Act of 1954, as amended in order to encourage and stimulate increases in the food and agricultural production of developing nations receiving assistance under such act, to facilitate increased United States efforts to meet the threat of growing human hunger and malnutrition and for other purposes.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS: The U. S. Department of the Interior's Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL-3 "Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, U. S. Department of the Interior, Bureau of Commercial Fisheries, 1815 N. Fort Myer Drive, Rm. 510, Arlington, Va. 22209.



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| CFS-4027 | - Maine Landings, November 1965, 4 pp. |
| CFS-4028 | - Rhode Island Landings, October 1965, 3 pp. |
| CFS-4029 | - Texas Landings, November 1965, 3 pp. |
| CFS-4032 | - Shrimp Landings, September 1965, 5 pp. |
| CFS-4034 | - Fish Sticks, Fish Portions, and Breaded Shrimp, October-December 1965, 3 pp. |
| CFS-4038 | - Fish Meal and Oil, December 1965, 2 pp. |

Sep. No. 756 - Ocean Clam Survey off U. S. Middle Atlantic Coast--1963.

Sep. No. 757 - Identification of Species in Raw Processed Fishery Products by Means of Cellulose Polyacetate Strip Electrophoresis.

Sep. No. 758 - A Method of Forecasting the Relative Abundance of Northern Shrimp (*Pandalus borealis* Kr.) in Maine Waters.

Sep. No. 759 - Equipment Note No. 19--Trawl Cod-End Closing Device.

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THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, January 1966, 12 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, sardines, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, January 1966, 8 pp., illus. (U. S. Bureau of Commercial Fisheries, Tuna Resources Laboratory, P. O. Box 271, La Jolla, Calif. 92038.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, January 1966, 4 pp. (Market News Service, U. S. Fish and Wildlife Service, P. O. Box 447, Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the month indicated.

New England Fisheries--Monthly Summary, January 1966, 22 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery

landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

New York City's Wholesale Fishery Trade--Monthly Summary--December 1965, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; and landings at Fulton Fish Market docks and Stonington, Conn.; for the month indicated.

Production of Fishery Products in Selected Areas of Alabama, Florida, Louisiana, Mississippi, Texas, 1965 (Preliminary), by E. J. Barry, 25 pp., February 1966. (Fishery Market News Service, U. S. Fish and Wildlife Service, 600 South St., New Orleans, La. 70130.) Includes statistical tables showing total fishery products landings; crab meat production by areas and months; menhaden landings and production of fish meal, oil, and solubles. It also gives data on fishery imports through the New Orleans and Morgan City, La., Customs Districts, Port Isabel-Brownsville, and Houston, Tex., Mobile, Ala.; and Miami, Fla.; and LCL express shipments from New Orleans 1965 by months and destination. Also included are tables showing monthly range of wholesale prices of fishery products on the New Orleans French Market; Gulf states weekly shrimp and oyster pack, 1965; Gulf states canned shrimp, oyster, and crabmeat pack by years--five year-average; and fishery products market classification in Gulf areas--Gulf states.

Seattle--Landings, Receipts, and Values of Fishery Products, 1965 (Preliminary), by V. J. Samson, 19 pp., January 31, 1966. (Fishery Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Building, Seattle, Wash. 98104.) Reviews Pacific Northwest fisheries trends and their effect upon Seattle fishery receipts for 1965. Contains statistical tables on landings by U. S. halibut fleet; Seattle's landings and receipts of fishery products; carload and truckload shipments of fishery products by months; imports of canned fishery products; receipts of Alaska canned fish and shellfish; and names, classifications, and approximate standards as used on Seattle Wholesale Market.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, January 1966, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes Seattle's landings by the halibut and salmon fleets reported through the exchanges; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia

via rail, motor truck, shipping lines, and ex-vessel landings; and in ports from other countries through Washington customs district; for the month indicated.

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The Progressive Fish-Culturist, vol. 27, no. 3, July 1965, pp. 113-176, illus., processed, single copy 25 cents. Some of the articles are: "Survey, reporting and certification of diseases in fish production," by S. F. Snieszko; "Lake trout fin-clipping rates at two national fish hatcheries," by Merryll M. Bailey.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

ALGAE:

"Control of protein level of algae, *Chlorella*," by Frieda B. Taub and A. M. Dollar, article, *Journal of Food Science*, vol. 30, Mar.-Apr. 1965, pp. 359-364, printed. Institute of Food Technologists, 176 N. Adams St., Chicago, Ill. 60603.

"The marine algae of the Bermuda platform," by J. J. Frederick, abstract, *Dissertation Abstracts*, vol. 25, no. 8, 1965, p. 4371. University Microfilms, Inc., University of Michigan, 313 N. 1st St., Ann Arbor, Mich. 48103.

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Digestive Enzymes of the Crystalline Style of Strombus Gigas Linne. I. Cellulase and Some Other Carbohydrases, by Shiro Horiuchi and Charles E. Lane, 9 pp., printed. (Reprinted from *Biological Bulletin*, Vol. 129, No. 2, Oct. 1965, pp. 273-281.) Institute of Marine Science, The Marine Laboratory, University of Miami, 1 Rickenbacker Causeway, Miami, Fla. 33149.

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"Experimental use of fish pumps. IV - Transference of living fish and autopsy of pumped fish," by Chosei Yoshimuta and others, article, *Bulletin of the Japanese Society of Scientific Fisheries*, vol. 30, December 1964, pp. 951-954, printed in Japanese. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan.

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Annual Proceedings, for the year 1964-65, vol. 15, 61 pp., illus., printed, 1965. International Commission for the Northwest Atlantic Fisheries, Dartmouth, N. S., Canada. This is the fifteenth annual report of proceedings of the Commission and is a record of its activities and achievements July 1, 1964, to June 30, 1965. It contains an account of the activities of the Commission's Secretariat and the Fifteenth Annual Meeting, summaries of research carried out in each of the five Convention subareas, a review of possible conservation actions for the Commission area, and a list of scientists and laboratories engaged in the Commission's work.

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"A temperature controlled salt-water circulating apparatus for developing fish eggs and larvae," by W. E. Fahy, article, *Journal du Conseil*, vol. 28, no. 3, 1964, pp. 364-384, illus., printed, single copy 20 kroner (about US\$2.90). Andr. Fred. Høst & Fils, Bredgade 35, Copenhagen, Denmark.

MARINE PHARMACOLOGY:

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RED COLOR OF SHELLFISH STUDIED BY ALASKAN LABORATORY

Color is probably the most important criteria in eye appeal in a food market. Housewives want green peas, red salmon, pink shrimp, and scarlet crab. Certain colors count; a few are forbidden. So color has become an important factor in marketing fish and shellfish. So say chemists of the U. S. Bureau of Commercial Fisheries Technology Laboratory at Ketchikan, Alaska.

Trying to learn how to retain the natural red color in Alaskan shrimp and crab during processing is one of the current projects of the Ketchikan Laboratory. As the nature of the carotenoid pigments causing red and orange colors is not fully understood, the problem is difficult.

The purpose of the Technology Laboratory at Ketchikan is to assist processors to turn out a quality product as well as an economic one. The laboratory employs 5 chemists and 3 assistants. It has been in operation since 1940. It operates under the regional office of the U. S. Bureau of Commercial Fisheries in Juneau, Alaska.

YEAR-LONG STUDY OF GULF STREAM

A year-long study of the Gulf Stream--the most extensive since Benjamin Franklin first studied the mysterious "ocean river" nearly two centuries ago--was started early in July 1965. Two oceanographic research vessels launched the lengthy and painstaking study. They left Norfolk, Va., and Savannah, Ga. With the latest devices of modern science, an effort will be made to unlock the secrets of the massive but elusive stream in the Atlantic Ocean. The vessels are the Explorer and the Peirce, two vessels of the "white fleet" of the Coast and Geodetic Survey, U. S. Department of Commerce.



Fig. 1 - U. S. Coast and Geodetic Survey oceanographic research vessel Explorer.

Participating in the undertaking, as the study continues, will also be Weather Bureau aircraft. Other participants will be the Massachusetts Institute of Technology, Woods Hole (Mass.) Oceanographic Institution, the University of Rhode Island, Columbia University, the University of Miami, and the Lerner Marine Laboratory at Bimini, in the Bahamas. These will furnish scientists or vessels, in some instances both, for the study. Additional organizations may join in later.

The ambitious undertaking is designed to enable oceanographers to predict changes in the strength and flow of the constantly-changing stream. Out of this may come better predictions of weather over the large area affected by the Stream and of fishery conditions.

The study's project director describes the Gulf Stream as "the major oceanographic phenomenon closest to the U. S." Commenting on the scope of the program, he said: "The Gulf Stream must be clearly understood so that its role can be evaluated in weather modification, fisheries utilization, and commerce. The Stream is apparently quite variable, not only in its speed, but in its location. The Stream's major axis between the Straits of Florida and Cape Hatteras, N. C., is known to migrate closer and farther from the coast. Northeast of Cape Hatteras, the Stream is not a straight flowing 'river in the sea,' but often forms great looping meanders. It is known that these meanders change position with time but it is not known how fast they do so or what the underlying causes might be."

The oceanographers will concentrate their study off Miami, Fla.; in the area between the Straits of Florida and Cape Hatteras off Charleston, S. C.; and in the North Atlantic from Cape Hatteras out into the ocean to the area south of Nova Scotia.

The Explorer's task will be to map the Gulf Stream in the North Atlantic to determine whether there is a regular pattern to changes in the Stream's meanders.

The Peirce, which is based at Savannah, has been assigned the task of determining the volume and pattern of water carried by the Gulf Stream off Charleston, S. C.

When the study is completed science will have a much better understanding of the great stream which, when it leaves the Straits of Florida, is like a mighty river 40 miles wide, 2,000 feet deep, discharging one hundred billion tons of water each hour. It has been calculated that the Gulf Stream carries each hour 22 times as much water into the sea as all the water discharged by all the rivers of the world in a similar period. (U. S. Coast and Geodetic Survey, July 11, 1965.)

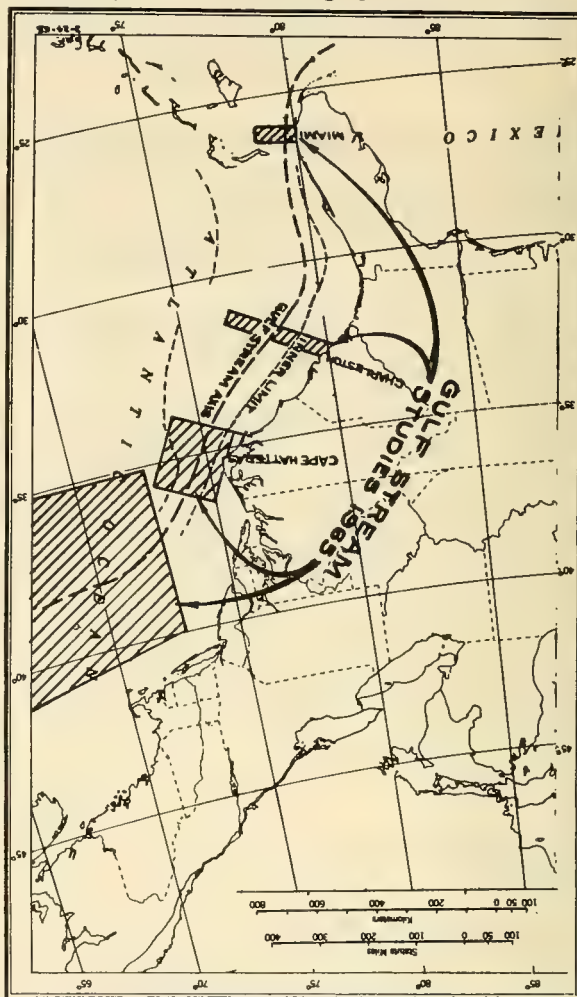
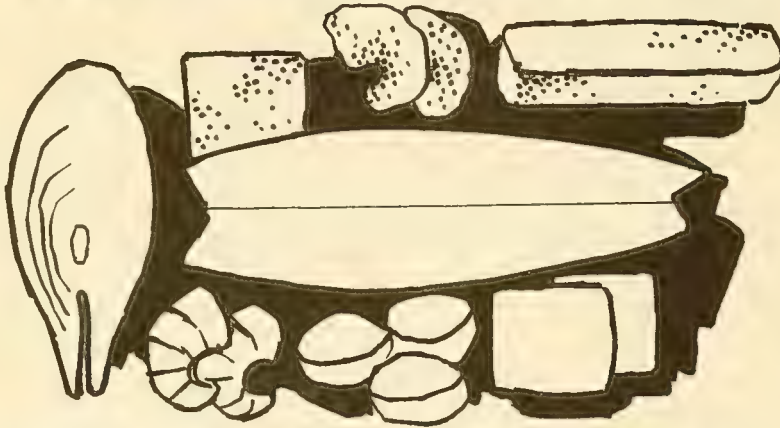


Fig. 2 - Shows area of Gulf Stream study.

USDI

14 STANDARDS ON FISHERY PRODUCTS



- | | |
|------------------------------------|----------------------------------|
| ● FROZEN FISH BLOCKS | ● FROZEN SALMON STEAKS |
| ● FROZEN COD FILLETS | ● FROZEN FRIED SCALLOPS |
| ● FROZEN HADDOCK FILLETS | ● FROZEN RAW BREADED SHRIMP |
| ● FROZEN HALIBUT STEAKS | ● FROZEN RAW HEADLESS SHRIMP |
| ● FROZEN OCEAN PERCH FILLETS | ● FROZEN SOLE & FLOUNDER FILLETS |
| ● FROZEN RAW BREADED FISH PORTIONS | ● FROZEN RAW BREADED FISH STICKS |
| ● FROZEN FRIED FISH PORTIONS | ● FROZEN FRIED FISH STICKS |

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COMMERCIAL FISHERIES REVIEW



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Fish and Wildlife Service
Bureau of Commercial Fisheries
Washington, D.C.



COMMERCIAL FISHERIES REVIEW



A review of developments and news of the fishery industries
prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor
G. A. Albano and H. Beasley, Assistant Editors

Address correspondence and requests to the: Chief, Fishery Market News Service, U.S. Bureau of Commercial Fisheries, 1815 North Fort Myer Drive, Room 510, Arlington, Va. 22209.

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5/31/68

CONTENTS

COVER: Two West Coast tuna purse seiners at a New Bedford, Mass., dock. These vessels were among the pioneers in the Northwest Atlantic tuna purse-seine fishery. (See p. 1 of this issue.)

Page	
1	..The Atlantic Tuna Fisheries, 1963, by Richard S. Shomura
12	..Pacific Hake (<i>Merluccius productus</i>) as Raw Material for a Fish Reduction Industry, by John A. Dyer, Richard W. Nelson, and Harold J. Barnett

Page	TRENDS AND DEVELOPMENTS:
	Alaska:
18 ..	Record King Crab Catch in 1965
18 ..	King Crab Workshop Held in Anchorage
19 ..	Record Shipment of King Crab Leaves Alaska
	California:
19 ..	State Accepts Iron Gate Salmon Hatchery
19 ..	Cans--Shipments for Fishery Products, January-December 1965
	Central Pacific Fisheries Investigations:
19 ..	Tuna Biological Studies Continued
	Chesapeake Bay:
20 ..	Frigid Weather Destroys Croaker Crop
	Columbia River:
21 ..	Salmon Hatchery Evaluation Project Shows Promising Results
	Containers:
21 ..	New Foam Box for Transporting Live Tropical Fish

Page	TRENDS AND DEVELOPMENTS (Contd.):
	Federal Purchases of Fishery Products:
22 ..	Department of Defense Purchases of Fresh and Frozen Fishery Products, January 1966
	Fish Spotting:
22 ..	Experiments Using Balloons for Spotting Fish Continued
	Fish Sticks and Portions:
23 ..	U. S. Production, 1965
	Industrial Fishery Products:
	U. S. Fish Meal and Solubles:
25 ..	Production and Imports, January 1966
	U. S. Fish Meal, Oil, and Solubles:
25 ..	Production by Areas, February 1966
25 ..	Production, January 1966
	Inventions:
26 ..	Ring Buoy Life Preserver Patented
	Marketing:
26 ..	Edible Fishery Products, 1965 and Outlook for 1966

Contents continued page II.

CONTENTS (CONTINUED)

Page		Page	
	TRENDS AND DEVELOPMENTS (Contd.):		FOREIGN (Contd.):
	Michigan:		Canada (Contd.):
27 ..	Changes in Commercial Fishing Regulations	43 ..	Atlantic Herring Fishery Conference Planned
27 ..	Lawmakers Seek Funds Under Anadromous Fish Act of 1965	43 ..	New Brunswick Fisheries Development Projects for 1966
	North Atlantic Fisheries Explorations and Gear Development:	44 ..	New Fisheries Patrol Vessel for Nova Scotia Area
27 ..	Trawl Gear Evaluations and Haddock Survey Oceanography:	44 ..	Fisheries Trade Mission to Australia and New Zealand
29 ..	2nd Annual Oceanographic and Marine Sciences Meeting	44 ..	Newfoundland Whaling Potential to be Surveyed by Japanese Vessel
29 ..	Bureau's Research Vessel Launched		Canary Islands:
	Oregon:	44 ..	Fishery Activities
29 ..	Coho Salmon Transplants		Cuba:
	Oysters:	46 ..	Fish Meal Imported from Morocco
30 ..	Artificial Propagation Discussed at Olympia Meeting		Denmark:
	Salmon:	46 ..	Pond Trout Market Trends in 1965 and Outlook for 1966
31 ..	U. S. Pacific Coast Canned Stocks, February 1, 1966	46 ..	Experimental Production of Odorless, Tasteless, Edible Fish Meal
	Shad:		Ecuador:
32 ..	Susquehanna Study Program Extended Through June 1966	47 ..	Japanese Tuna Enterprise Fails to Materialize
	Shrimp:		Gabon:
32 ..	Breaded Production, 1965	47 ..	Atlantic Tuna Fisheries
33 ..	United States Supply and Disposition, 1963-65		East Germany:
	Tuna:	48 ..	Fishery Research in the Northwest Atlantic
33 ..	Attractant Study	48 ..	Small Stern Trawlers Sold to Danish Firms
	United States Fisheries:	48 ..	Sale of Fishing Vessels to Sweden
34 ..	Anadromous Fishery Program Planned		Ghana:
	U. S. Vessels:	48 ..	Soviet Fishery Aid
35 ..	Accommodations Survey		Greece:
35 ..	New Cutter Commissioned for Alaska Duty	48 ..	Soviets Deliver Stern Trawlers to Greece
36 ..	Documentations Issued and Cancelled, November and December 1965		Hong Kong:
	U. S. Foreign Trade:	48 ..	Recent Fishery Trends
36 ..	Imports of Canned Tuna in Brine Under Quota		Hungary:
	Wholesale Prices:	49 ..	Fish Meal from Pakistan
37 ..	Edible Fish and Shellfish, March 1966		Iceland:
	FOREIGN:	49 ..	Export Stocks of Principal Fishery Products, December 31, 1965
	International:		India:
	Fish Meal:	49 ..	To Buy Fishing Vessels Abroad
40 ..	Manufacturers Meet in Cape Town, South Africa	49 ..	Exports of Fishery Products Increasing
	Northwest Pacific Fisheries Commission:		Ivory Coast:
40 ..	Japanese Industry Seeks Extension of Convention	50 ..	Fishery Landings, 1965
41 ..	Japan and U.S.S.R. Differ on Status of King Crab Resource in Northwest Pacific		Japan:
	Food and Agriculture Organization:	50 ..	Tuna Landings in Yaizu, February 1966
41 ..	Fishery Data Center Established	50 ..	Tuna Fishing Trends
	International Whaling Commission:	51 ..	Tuna Fishing off Australia
41 ..	North Pacific Member Nations Review Area Situation	51 ..	Expands Tuna Purse-Seine Test Fishing off West Africa
	Argentina:	52 ..	Power Reel to Save Labor on Tuna Vessels
42 ..	Frozen Fish Industry	52 ..	Labor-Saving Devices Being Adopted by Tuna-Fishing Firms
42 ..	Crab Fishing Potential	52 ..	Testing Vertical Long Line
	Bulgaria:	52 ..	Fishing Companies Show Deficit in Tuna Operations
43 ..	Fishery Trends	53 ..	Frozen Tuna Export Market Outlook in 1966
	Burma:	53 ..	Frozen Tuna Exports to U. S. and Puerto Rico, December 1965
43 ..	U.S.S.R. Ends Joint Fishery Research with Burma	53 ..	Skipjack Tuna Market Good
	Canada:	54 ..	Exports of Canned Tuna, January-October 1965
43 ..	Per Capita Consumption of Fishery Products Increases in 1964	54 ..	Frozen Swordfish Export Validations to the U. S. and Canada, April-December 1965
		54 ..	King Crab Mothership Licensed to Operate in Eastern Bering Sea

CONTENTS (CONTINUED)

Page	FOREIGN (Contd.):	Page	FOREIGN (Contd.):
	Japan:		Taiwan:
55 ..	Herring Will be Imported from U.S.S.R. in 1966	74 ..	Small Increase in 1965 Fishery Landings
55 ..	Exports of Frozen Rainbow Trout, December 1965	74 ..	Seeking Further Japanese Cooperation in Fisheries
55 ..	Exports of Marine Products, October 1965		Thailand:
56 ..	Foreign Trade in Fish Meal Up in 1965	75 ..	Fisheries Legislation Favors Domestic Fishermen
56 ..	Contracts for Sale of Antarctic Whale Oil		Trinidad:
56 ..	Exploratory Fishing off Australia	75 ..	Foreign Vessel Activity
57 ..	West African Trawlers Change Fishing Policy		U.S.S.R.:
	Jordan:	76 ..	Exports of Fishery Products to Western Nations
57 ..	Fishery Trends in 1965 and Outlook for 1966	76 ..	Promotion of Exports to West Europe
	Republic of Korea:	76 ..	Establishment of Foreign Trade Sections
58 ..	Bureau of Fisheries Established	76 ..	Fishery Exports to the U. S. Double in 1965
	Liberia:	77 ..	Production of Canned King Crab from Eastern Bering Sea
58 ..	Atlantic Tuna Fisheries	77 ..	Bering Sea Shrimp Catch Plans, 1966
	Malagasy Republic:	77 ..	Exploitation of Alaska Pollock Increased
58 ..	Joint Fishing Venture in Malagasy Republic to Expand	77 ..	Meat Production Goal Lags Behind That of Fishery Products
	Mauritania:	78 ..	Fishing off Greenland to Expand
59 ..	New Cold-Storage and Processing Plant	78 ..	Purse Seine for Herring in North Atlantic
	Mexico:	78 ..	Hake Fishing in Eastern Pacific
59 ..	Foreign Fishing Activities off Mexico's Coasts	78 ..	Research in the Indian Ocean
	Morocco:	79 ..	Cultures Shrimp Successfully
60 ..	Sardine Fleet Damaged by Storm	79 ..	Shark Fishery
	Nigeria:	79 ..	New Law Bans Dolphin Hunting
60 ..	Japanese Survey Nigerian Fishing Industry	79 ..	Oceanographic Research in the Caribbean Sea
60 ..	Lake Chad Fishery Developments	79 ..	Pacific Fishing Fleet Increasing
	Norway:	80 ..	Refrigerator Fleet
61 ..	Herring Fishery Opens with Heavy Catches in Early 1966	80 ..	Far East Fishing Fleet Receives New Vessels
61 ..	New Automated Purse Seiners for Herring Fishery	80 ..	New Repair Shipyard at Klajpeda
61 ..	Canned Fish Export Trends, January 1-December 25, 1965, with Comparisons	80 ..	Finnish Fishing Bases on Soviet Islands
	Panama:		United Arab Republic:
62 ..	Fishery Developments, 1965	80 ..	Fishery Plans 1966-1970
	Peru:		United Kingdom:
65 ..	Fish Meal Production and Anchovy Catch, January-February 1966	81 ..	May Join Other Countries in Fishing South African Hake
65 ..	Reduction Plants Buy Norwegian Equipment to Process Fish Solubles		Venezuela:
	Philippine Republic:	81 ..	New Research Vessel <u>La Salle</u> Delivered from Norway
66 ..	Fishing Industry Developments, 1965		Yugoslavia:
	Poland:	81 ..	Fish Meal Imports
68 ..	Fishery Trends and Developments	82 ..	Foreign Fishing Off United States Coasts, March 1966
70 ..	Oceanographic Research Vessels Being Built for U.S.S.R.		FEDERAL ACTIONS:
	Rumania:		Department of the Interior:
70 ..	Fishery Landings in 1965		Commercial Fisheries Research and Development Act:
71 ..	Accession to Tripartite Fisheries Cooperation Agreement	86 ..	Federal Aid for Fishery Projects
	Ryukyu Islands:		Fish and Wildlife Service:
71 ..	Fisheries Studied by U. S. Expert		Bureau of Commercial Fisheries:
	Senegal:	88 ..	Request to U. S. Food and Drug Administration for Approval of Fish Protein Concentrate Made From Fish
71 ..	Atlantic Tuna Fisheries	89 ..	Increased Interest Rate on Fisheries Loan Fund Became Effective, April 1, 1966
	South Africa:	90 ..	Applications for Fishing Vessel Loans
72 ..	Good 1966 Fishing Season Forecast	90 ..	Hearings on Applications for Fishing Vessel Construction Differential Subsidy
72 ..	New Spiny Lobster Plant	90 ..	Hutchinson Named to Head International Trade Promotion in Fisheries
73 ..	New Stern Trawler with Shelter Deck		
	South-West Africa:		
73 ..	Boom Created by Fishing Industry		
74 ..	Commission to Study Status of Fishing Industry		

Contents continued page IV.

CONTENTS (CONTINUED)

Page		Page	
	FEDERAL ACTIONS (Contd.):		FEDERAL ACTIONS (Contd.):
	U. S. Tariff Commission;		Department of the Treasury (Contd.):
91 ..	Valuation Laws of the United States and of the Principal Trading Partners of the United States	93 ..	U. S. Coast Guard (Contd.):
	Department of the Treasury:		Reports of Foreign Fishing Vessels Within 200 Miles of U. S. Territorial Waters
	U. S. Coast Guard:	93 ..	Eighty-Ninth Congress (Second Session)
91 ..	Assistance to New England Fishing Fleet in 1965		RECENT FISHERY PUBLICATIONS:
92 ..	Hearing on Proposed Changes in Navigation and Vessel Inspection Rules and Regulations	99 ..	Fish and Wildlife Service Publications
		101 ..	Miscellaneous Publications



ISRAELI CARP FOR CONTROL OF AQUATIC WEEDS IN PONDS

The use of Israeli carp as a means of controlling aquatic weeds in ponds has been under investigation by the U. S. Bureau of Sport Fisheries and Wildlife.

At the Fish Farming Experimental Station at Stuttgart, Ark., Israeli carp were stocked at rates of 12, 20, and 50 per acre in 12 ponds which contained various combinations of other fish. Throughout the growing season of 1963, troublesome amounts of vegetation did not appear in any of those ponds.

One experiment involved a group of 8 ponds, of which 4 were stocked with Israeli carp and 4 were not. All those ponds had growths of filamentous algae, but the algae became a problem only in the 4 ponds that did not contain the Israeli carp. (The Progressive Fish-Culturist, January 1965.)

Editorial Assistants: Ruth V. Keefe and Jean Zalevsky

Compositors: Alma Greene, Mary Andrews, and Mary Donaldson

* * * * *

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THE ATLANTIC TUNA FISHERIES, 1963^{1/}

By Richard S. Shomura*

ABSTRACT

The Atlantic landings of tunas and bonitos increased threefold from 1956 to 1963. In 1963, the total Atlantic catch was estimated at 257,600 metric tons. The increase can be traced to the expansion and modernization of the older tuna fisheries and the development of new fisheries. The latter category includes the African surface fishery, Northwest Atlantic purse-seine fishery, and the Japanese Atlantic long-line fishery.

The present report summarizes the recent trends in landings of the commercially important tuna species in the Atlantic, describes the statistics on landings and the fishing methods employed in the various tuna fisheries, and presents an initial attempt to assess the magnitude of the Atlantic tuna resources by comparing the Atlantic landings with Pacific landings.

CONTENTS

	Page		Page
Trends in tuna landings, 1956-63:	3	Newer Atlantic tuna fisheries:	5
Yellowfin	3	Cuban tuna fishery	5
Albacore	3	African surface fishery	6
Bluefin	4	Northwest Atlantic purse-seine fishery	6
Bigeye	4	Japanese Atlantic long-line fishery	7
Skipjack	4	Comparison of Atlantic and Pacific tuna landings	8
Older Atlantic tuna fisheries:	4	Acknowledgment	10
Northeast Atlantic bluefin tuna fishery	4	Literature cited	10
Bay of Biscay albacore fishery	4		

Tunas support one of the most widespread and most rapidly growing fisheries in the world today. In 1948, the total world catch of tunas, including bonitos, was 308,450 metric tons.^{2/} The largest portion of the catch came from coastal waters, and only in the Pacific did the range of the fisheries extend far beyond the immediate shores. Since 1948 new tuna fisheries have developed, old ones have undergone modernization and expansion, and the landings of tunas and bonitos^{3/} have quadrupled. About 1.25 million tons were landed in 1963.

In recent years a large part of this growth took place in the Atlantic Ocean. The total catch of tunas and bonitos from the Atlantic was 81,400 tons in 1956. By 1963, only 7 years later this take had more than tripled to 257,600 tons.

Although some of the growth in the Atlantic can be attributed to modernization and expansion of the older fisheries, the largest increase came from three new fisheries--the Japanese Atlantic long-line fishery, the African surface fishery, and the Northwest Atlantic purse-seine fishery.

Descriptions of some of the tuna fisheries in the Atlantic are available, and some analytical studies have been carried out. Wilson (1965) described the development of the Northwest purse-seine fishery. Lima and Wise (1963) analyzed data from the long-line fishery off South America. For the eastern tropical Atlantic, LeGuen, Poinsard, and Troadec (1965) re-

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^{1/}An earlier draft of this manuscript was distributed as a background paper for the Second Session of the FAO Working Party for the Rational Utilization of Tuna Resources in the Atlantic Ocean.

^{2/}All weights presented in this report are in the metric system unless stated otherwise. A metric ton equals 2,205 pounds.

^{3/}Includes species listed under the category of Tunas, Bonitos, Skipjack in the FAO Yearbook of Fishery Statistics (FAO 1964).

viewed the surface fishery off Pointe-Noire (Congo-Brazzaville). There is still, however, a lack of general information and statistics on the Atlantic tuna fisheries.

The objectives of this report are to: (1) present and discuss the recent trends in landings of the principal tuna species; (2) review briefly the major fisheries in the Atlantic with emphasis on newly developed fisheries; and (3) compare Atlantic landings with Pacific landings to gain some insight into the magnitude of the potential tuna resources in the Atlantic.

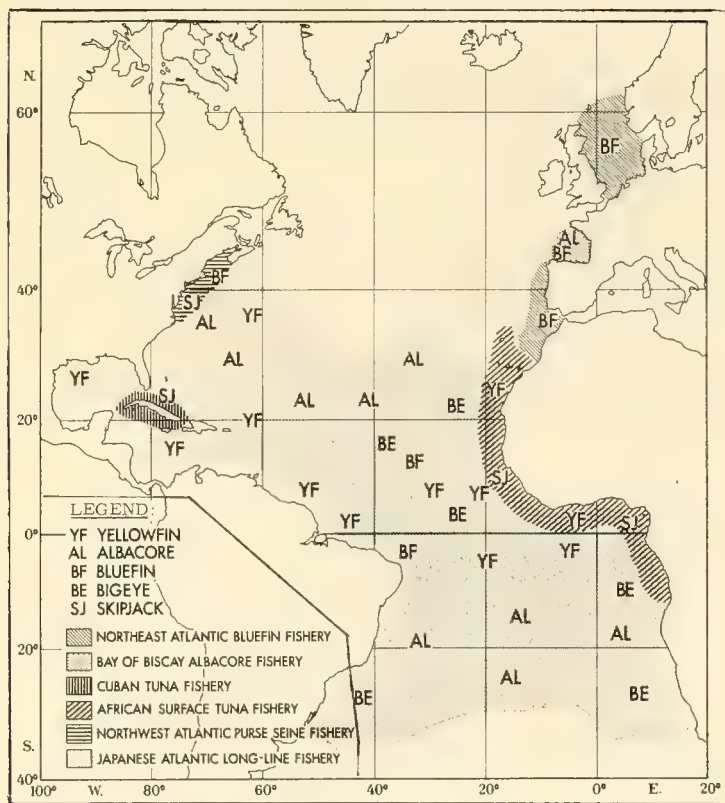


Fig. 1 - Location of Atlantic tuna fishing grounds.

This discussion is limited to the five species of tunas and tuna-like fishes considered to be of worldwide importance: yellowfin (*Thunnus albacares*), albacore (*T. alalunga*), bluefin (*T. thynnus*), bigeye (*T. obesus*), and skipjack (*Katsuwonus pelamis*). It is convenient to treat the Atlantic fisheries by area, as follows: (1) Northeast Atlantic bluefin fishery; (2) Bay of Biscay albacore fishery; (3) Cuban tuna fishery; (4) African surface tuna fishery; (5) Northwest Atlantic purse-seine fishery; and (6) Japanese Atlantic long-line fishery. Figure 1 shows the general location of these fisheries. The numerous subsistence fisheries located along the coasts of continents and islands are not discussed. Also omitted are fisheries for which information is not readily available from the literature, such as the pole-and-line fishery in the Azores Islands.

A brief description of the different methods of fishing discussed in this report may be appropriate. The four basic methods of tuna fishing in the Atlantic are pole and line, purse seine, long line, and traps.

The pole-and-line method is used in surface fishing and is also commonly known as live-bait fishing. Small fish are tossed into the midst of a tuna school to attract the tunas to the fishing boat. Fish are caught with barbless hooks attached to a length of line on a bamboo pole. Rawlings (1953) provided a good description of the method employed on a small scale in Cuba, and Godsil (1938) gave an excellent account of the large pole-and-line tuna fishery then operating out of California.

The purse seine also is employed for surface fishing. Here a large net is set around a school of tuna and by a "pursing" arrangement the bottom of the net is closed to prevent escape of the fish. After the net has been pursued the catch is hauled onto the fishing boat. McNeely (1961) gave an excellent description of the present purse-seine gear and method employed in the eastern Pacific.

The pelagic long-line gear was developed by the Japanese and is used to catch the large-size tunas and billfishes. The gear consists of a series of mainline sections suspended from the surface of the water by floats. Attached to the mainline at intervals are dropper lines with hooks baited with fresh or salted fish. The depth of fishing is variable and dependent on the length of line (mainline, float line, and dropper), the distance between buoys, and the prevailing currents. In most long-line fishing, however, the hooks are placed at depths of 200 to 700 feet. The gear is set in the early morning and is allowed to drift free of the ship. Haul-

ing is usually started in the early afternoon. A Japanese boat usually fishes about 2,000 hooks per day. The total length of long-line fished on one set may equal about 50 nautical miles. Shapiro (1950) reviewed the historical development of commercial long-line gear in Japan.

The traps used in tuna fishing along coastal waters of the Atlantic are described briefly in this paper in the section on the Northeast Atlantic bluefin fishery.

TRENDS IN TUNA LANDINGS, 1956-63

Landings of the five principal species of tuna from the Atlantic Ocean and adjacent seas⁴ for 1956-63 are shown in figure 2. In this and subsequent discussions on landings the reader is referred to comments on the availability and accuracy of world catch statistics (Chapman 1963). Chapman pointed out that "It is questionable whether the totals (landing figures) thus arrived at are closer than ten or fifteen percent of being accurate."

YELLOWFIN: Prior to 1956, the yellowfin tuna resources of the tropical Atlantic were not commercially exploited. FAO records (FAO 1960) show only 200 tons of yellowfin landed from the Atlantic in 1956, all by U.S. vessels. Undoubtedly, yellowfin were taken in subsistence fisheries located along the coastal waters of the tropical Atlantic. These catches were included, however, either in the totals of other species or were not reported to FAO. As the African surface fishery and the Japanese long-line fishery developed, the landings of yellowfin tuna steadily increased from 200 tons in 1956 to 74,700 tons in 1960. Catches declined somewhat in 1961 and 1962 but increased again in 1963. The decline in 1961 and 1962 was attributed to the relatively low yellowfin catches by the Japanese long-line fishery.

Although the contribution of the African surface tuna fishery to the total yellowfin catch has increased recently, most of the annual landings have come from the Japanese long-line fishery. In 1963, the Japanese fishery landed 55 percent of the Atlantic yellowfin catch.

ALBACORE: Albacore and bluefin tunas made up most of the Atlantic tuna catch prior to 1956. In 1956, albacore landings for the Atlantic were 37,700 tons. With the exception of a small quantity reported from Angola, all came from the important albacore fish-

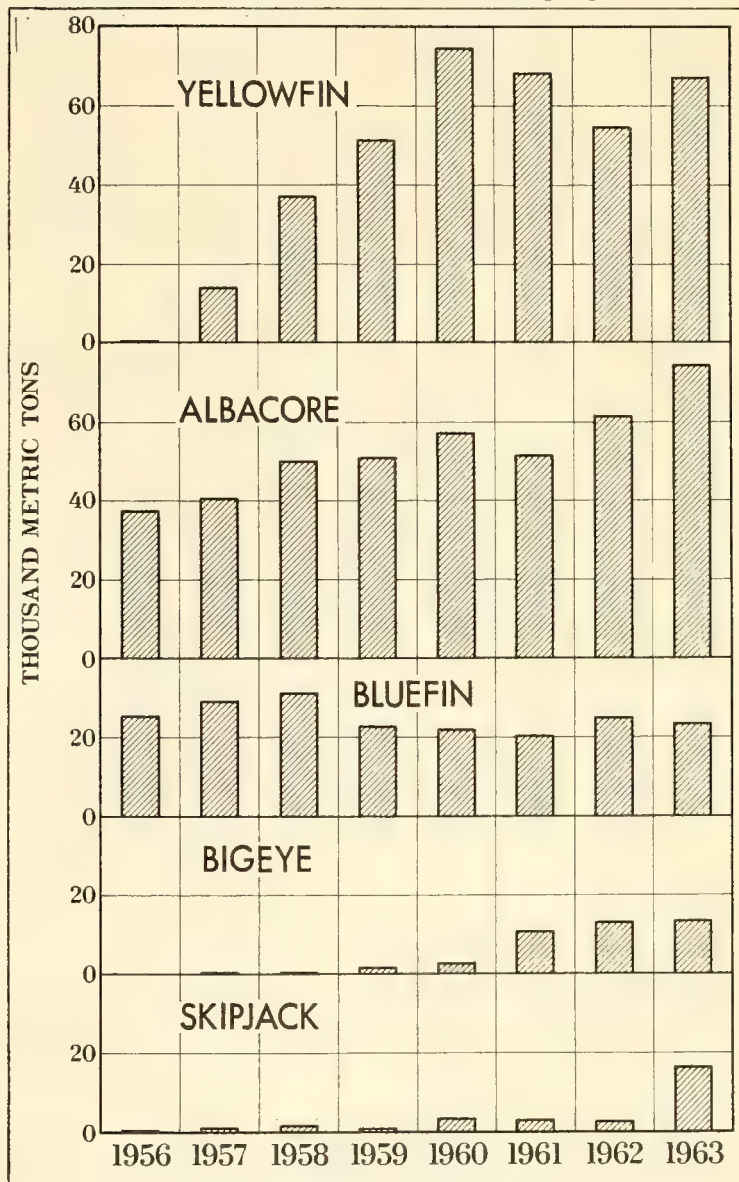


Fig. 2 - Atlantic tuna landings, 1956-63.

⁴/Excluding the Mediterranean Sea.

ery in the Bay of Biscay. From 1956 to 1963, the catch increased from 37,700 tons to 74,500 tons, principally due to the increased effort of the Japanese long-line fishery. The Japanese have increased their share of Atlantic albacore landings from about 2 percent in 1957 to 37 percent in 1963.

BLUEFIN: The Atlantic bluefin tuna landings increased from 25,200 tons in 1956 to a high of 31,100 tons in 1958, followed by a noticeable decline from 1959 to 1963. For 1959-63 the annual landings averaged 22,900 tons. From his examination of the long-term trends, K. Tiews (personal communication) reported that the recent landings were considerably lower than for the 1952-55 period, when the average annual bluefin landing for the Atlantic (excluding Mediterranean catches) was 33,000 tons.

The peak in 1958 was primarily due to the excellent catches in the Moroccan fishery, which landed 10,500 tons of bluefin tuna. The records (data provided by K. Tiews) indicate that the annual Moroccan catch did not exceed 4,900 tons in 1950-57 and has not exceeded 6,000 tons since the high in 1958.

The Japanese long-line catch of bluefin tuna has steadily increased from 0.3 percent of the total Atlantic catch in 1957 to approximately 32 percent in 1963.

BIGEYE: Until the Japanese began fishing the high seas of the tropical Atlantic Ocean, bigeye tuna were taken only occasionally and were often confused either with blackfin (*Thunnus atlanticus*) or bluefin tuna (Mather and Gibbs 1958). The deep-fishing gear used by the Japanese revealed a sizable resource of large-size bigeye tuna in the Atlantic.

Although figure 2 does not show a bigeye catch for 1956, small quantities of small bigeye tuna were probably caught with surface fishing gear. Bigeye landings have increased from 500 tons in 1957 to 13,300 tons in 1963, nearly all taken by the Japanese long-line fishery.

SKIPJACK: Prior to 1963, only a negligible amount of skipjack tuna was landed from the Atlantic. From 1956 to 1962, the highest landings reported were 3,300 tons in 1960. In 1963, the catch increased suddenly to 16,700 tons, principally taken by the Northwest Atlantic purse-seine fishery and the African surface tuna fishery. It is generally believed that this resource could support a much larger catch.

OLDER ATLANTIC TUNA FISHERIES

The older tuna fisheries have been in existence for a long time. Information is available from so many sources, that the status of these fisheries need be reviewed only briefly.

NORTHEAST ATLANTIC BLUEFIN FISHERY: Countries and size of catch in 1963 were:

Country	Metric Tons	Country	Metric Tons
Norway	100	Portugal	400
Germany	Less than 100	Spain	7,900
Denmark	Less than 100	Morocco	1,500
Sweden	No catches listed	France	500

Hamre and Tiews (1962) reported that bluefin tuna caught off the Norwegian coast and those taken in the central waters of the North Sea by German fishermen come from the same stock. In Norway tuna fishing is carried out by the two-boat purse-seine method, introduced in 1946. The center of the fishery is off Bergen, Norway, and the bulk of the bluefin catch is made within 30 miles of land. The season extends from mid-July to September, with August the peak month. The size of fish ranges from 300 to 800 pounds.

Danish, Swedish, and German fishermen use the hook-and-line method of fishing (Tiews 1963). In the German fishery five or six hooks are fished from each boat. Each hook is baited with a fresh fish (herring, mackerel, or whiting) and is positioned at a predetermined depth, usually 20-25 meters (66-82 feet), depending on the length of dropper line attached to a float.

The gear is then allowed to drift free of the boat. The season for this fishery extends from mid-August to the end of October. The size of tuna caught ranges from 400 to 700 pounds.

In the lower latitudes of the Atlantic, bluefin tuna are taken mostly by traps operated along the coasts of Spain, Portugal, and Morocco. These traps are large rectangular nets which extend from shore out into the sea. The entire fishery depends on movement of the bluefin along the coasts during their seasonal migration. In Spain the fishing season extends from May to mid-August. The average size of bluefin taken exceeds 250 pounds.

In addition to the trap fishery, bluefin are taken in commercial quantities by troll gear off Portugal. The pole-and-line method with small fish as bait is used by French fishermen in the Bay of Biscay from June to August. Bluefin tuna taken in the Portuguese fishery are small, ranging from approximately 6 to 30 pounds. Those taken in the Bay of Biscay fishery are larger, from 15 to 75 pounds.

BAY OF BISCAY ALBACORE FISHERY: Countries and size of catch in 1963 were: Spain - 28,300 tons, and France - 14,400 tons.

Until the mid-1950's, the Bay of Biscay albacore fishery was the largest single tuna fishery in the Atlantic. Albacore landed by France and Spain totaled 35,700 tons in 1956, which represented approximately 56 percent of the total Atlantic landings of the five principal species discussed in this paper. In 1963, although the Bay of Biscay albacore catch had increased to 42,700 tons, this take represented only 22 percent of the total Atlantic catch of the five principal species.

Very little information is presently available on the Bay of Biscay albacore fishery. Until 1946, albacore were caught only by trolling. In 1947, the French introduced the pole-and-line method (Postel 1963). Although the French were recently reported to be experimenting with purse seines, the pole-and-line system is still the principal method of fishing. Information on the results of the purse-seine experiments is not yet available.

The albacore season extends from June to November. The fish first appear off the northwest coast of Spain in June (Postel 1963). In July they migrate into the Bay of Biscay, move offshore and to the northwest in August and September, return to the Bay of Biscay in October, and leave the bay in November.

Albacore taken by the Bay of Biscay fishery are small. The largest of three size groups is less than 25 pounds.

NEWER ATLANTIC TUNA FISHERIES

Development of new fisheries in the middle 1950's brought to the Atlantic the same mobility that characterizes some Pacific tuna fisheries. Today the Japanese long-line fishery covers a large part of the Atlantic. Tuna boats from Spain, France, Portugal, and the United States travel great distances to fish off West Africa. These newer fisheries merit detailed discussion.

CUBAN TUNA FISHERY: The catch of the early 1950's was about 1,500 tons of skipjack and blackfin tunas.

A small pole-and-line fishery for skipjack and blackfin (*Thunnus atlanticus*) tunas was first developed in Cuba in 1940 (Rawlings 1953). In 1956 the tuna fleet consisted of 18 boats. This fishery is coastal, mostly within 15 miles of shore. Skipjack make up 75 percent of the catch off the north coast but only 25 percent off the south coast. The average size of fish for both species was reported to be about 3 pounds.

In addition to the live-bait fishery, Cuba now has a small long-line fishery (Buesa 1964). The state-operated fleet presently consists of five long-liners which were built in Japan. In 1963, the total catch was 2,088 tons; presumably tunas made up the bulk of the take.

AFRICAN SURFACE FISHERY: Countries and size of catch in 1963 were:

<u>Country</u>	<u>Yellowfin</u> (Metric Tons)	<u>Skipjack</u>
France	8,800	2,200
Spain	6,600	2,200
Japan	2,200	2,200
Portugal	1,100	-

Until 1955 yellowfin and skipjack tunas were taken only in small quantities by subsistence fisheries located along the coast of Africa and the coastal waters of the offshore islands. In late 1955, six pole-and-line fishing tuna boats from France began fishing off Senegal. They were successful in catching commercial quantities of tuna in these waters and returned the following season. The fishery has grown since its modest start in 1955, and the fleet in 1963 was reported to consist of 90 French, 50 Spanish, 7 Japanese, and a few Portuguese tuna boats. In addition to yellowfin and skipjack, small quantities of bigeye tuna are also landed by this fishery. The increase in fishing intensity was accompanied by a geographical expansion of the fishery as far south as Angola. In the initial stages of development, the fishery off Senegal was seasonal, from October to February. Expansion of fishing grounds towards tropical waters extended the fishing season.

Presently the African tuna fishery is a pole-and-line operation. Recently several attempts have been made to introduce purse seines, but this method, so successful in the eastern Pacific, has thus far failed in the African fishery. In late 1964, Japan sent a purse-seine team to Africa to try two-boat purse seining, reportedly without much success.

NORTHWEST ATLANTIC PURSE-SEINE FISHERY: Bluefin tuna occur seasonally along the Atlantic coast of the North American continent. This species long has been the basis of a small fishery in the New England area. Along the Maine coast bluefin are taken by harpoon; off Massachusetts this species is taken by hook and line in the northern sectors and by traps in Cape Cod Bay. Prior to development of the purse-seine fishery, the catch averaged about 800 tons per year.

Wilson (1965) has documented the development of the Northwest Atlantic purse-seine fishery. The present discussion will be limited, therefore, to the results of the 1964 fishing season and some general comments on the fishery.

Purse seiners from the eastern Pacific tuna fishery first appeared in the Atlantic in 1962 and caused several changes in the fishery. Prior to 1962, fishing was restricted to Cape Cod Bay and the adjacent coastal waters, and the catch consisted almost entirely of bluefin. The greater capabilities of the larger purse seiners led to extension of the fishing area farther offshore, and the discovery of commercial quantities of skipjack. In 1963, skipjack made up 35 percent of the total tuna catch of 8,281 tons (Wilson 1965). In 1964, skipjack became the predominant species in the landings and made up 55 percent of the total of 9,810 tons.

Countries and size of catch in 1964 were:

<u>Country</u>	<u>Skipjack</u> (Metric Tons)	<u>Bluefin</u>
United States	5,000	4,000
Canada	360	450

In 1964, the tuna fleet operating in the Northwest Atlantic consisted of 13 medium and large purse seiners which normally fish in the eastern Pacific, 6 small purse seiners based in New England, and 2 small purse seiners from Canada.

Medium and large purse seiners fished an aggregate of 521 days in 1964 and made an average daily catch of 13.8 tons. By species, 7.8 tons of skipjack and 6.0 tons of bluefin were caught per fishing day. The season generally extends from June to September and covers the Continental Shelf from the Gulf of Maine to Cape Hatteras.

The size of bluefin taken by the purse-seine fishery varies from 60 to over 200 pounds. Skipjack tuna range from 5 to 15 pounds; the majority weigh from 5 to 7 pounds.

JAPANESE ATLANTIC LONG-LINE FISHERY: Size of catch in 1963 was:

	Metric Tons		Metric Tons
Yellowfin	35,000	Bluefin	7,400
Albacore	27,700	Bigeye	13,300

The Japanese long-line fishery started in the Atlantic with an exploratory cruise by a research vessel off the coast of South America in December 1955 (Nakagome and Suzuki 1963). On the basis of this and several other successful exploratory cruises in 1956, the Japanese commercial fleet began fishing in the tropical Atlantic in 1957. Despite the great distance from Japan to Atlantic tuna fishing grounds, the progressive increase in fishing effort and landings attest to a highly successful fishery.

Development and expansion of the Japanese long-line fishery are shown in figures 3, 4, and 5. Fishing was restricted in 1956 to the western Atlantic off South America. By 1958, the long-line fishery had extended throughout the tropical Atlantic from South America to Africa. Effort was generally confined to the area between the Equator and latitude 10° N. By 1962, the area of operation had expanded as far as latitude 30° N. and 30° S.

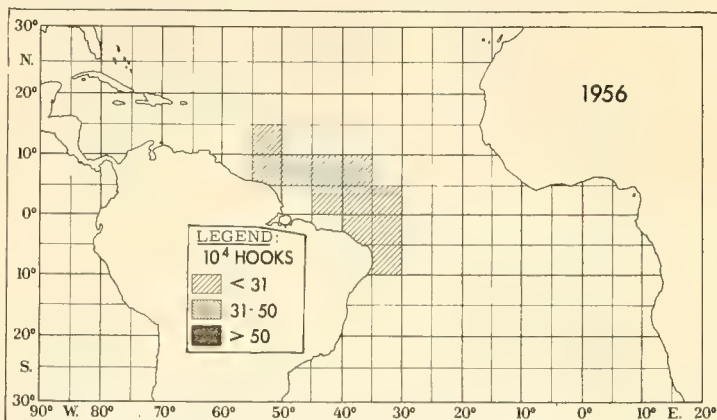


Fig. 3 - Distribution of Japanese long-line fishing effort in the Atlantic Ocean, 1956--adapted from Shiohama, Myojin, and Sakamoto (1965).

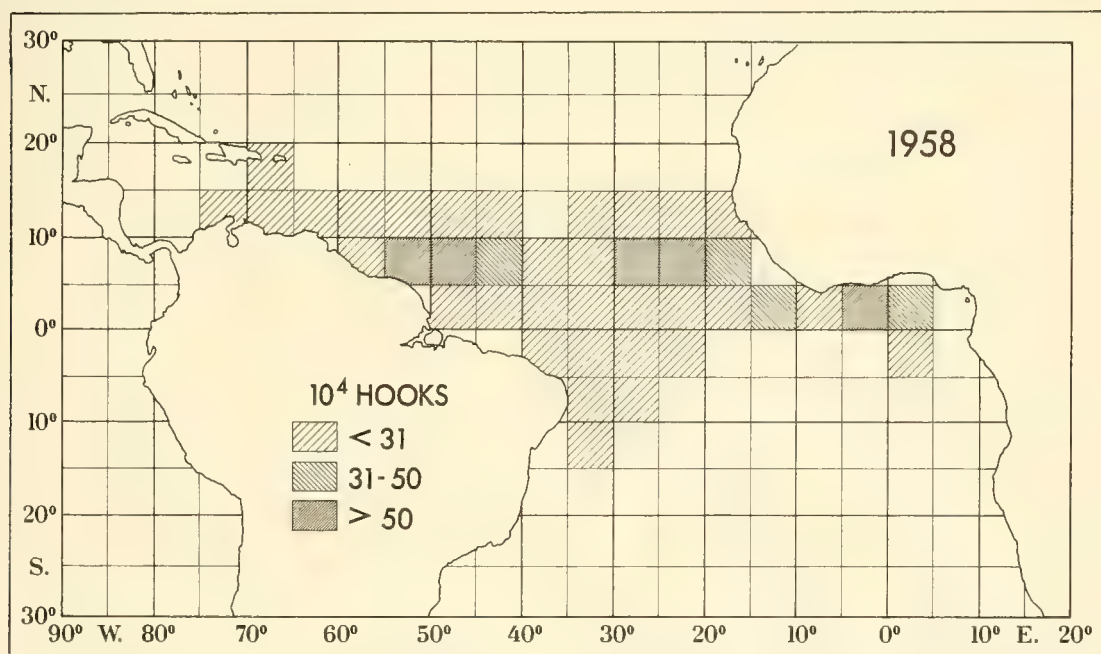


Fig. 4 - Distribution of Japanese long-line fishing effort in the Atlantic Ocean, 1958--adapted from Shiohama, Myojin, and Sakamoto (1965).

Figure 6 shows the trends in effort from 1956 to 1962 and the changes in fishing success. Only 136,000 hooks were fished in the Atlantic in 1956, primarily by research vessels operating in the western Atlantic. By 1962, total effort had increased to 54,340,000 hooks, representing approximately 27,200 boat-days. The lower panels in figure 6 show general trends in catch per unit of effort for the three principal species (yellowfin, albacore, and bigeye). The most striking feature is the sharp drop in catch rates for yellowfin--from an average of 7 to 9 fish per 100 hooks in 1956-58 to less than 2 per 100 hooks in 1962. In terms of tonnage these rates represent a drop from 7 tons to 1½ tons per fishing day. One would strongly suspect a decrease in stock size, although the change could be attributed in part to a shift in fishing grounds.

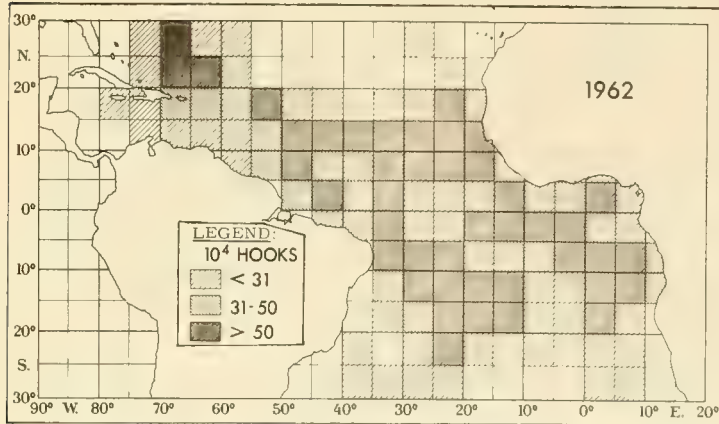


Fig. 5 - Distribution of Japanese long-line fishing effort in the Atlantic Ocean, 1962--adapted from Shiohama, Myojin, and Sakamoto (1965).

Initially, fishing for yellowfin tuna was centered in equatorial waters. Later, fishing was shifted to higher latitudes for albacore. As already stated, the fishery started off the coast of South America, moved eastward to the African coast, then expanded north and south. Although a detailed study has not been made of this shift in effort, it is likely that the good albacore catches in temperate waters caused a shift of a large part of the total effort away from the yellowfin grounds. The trend of the albacore catch, which increased from 900 tons in 1957 to 27,700 tons in 1963, suggests a shift from tropical to temperate waters, as does the change in catch rates. In 1956, albacore were caught at a rate of 0.8 fish per 100 hooks; by 1962, this figure had increased to 2.0 fish per 100 hooks. Unless abundance or availability of albacore increased, the increase in catch rates must have been due to a shift of the fishery.

Catch rates of bigeye tuna also increased in 1961 and 1962. This increase also may be attributed to a shift of the fishery. Bigeye, like albacore, are temperate-water tunas. Yellowfin are predominantly tropical.

Skipjack are not taken in commercial quantities with long-line gear.

COMPARISON OF ATLANTIC AND PACIFIC TUNA LANDINGS

Atlantic tuna landings increased substantially from 1956 to 1963. The catch became sufficiently large to raise questions about the size of the resource and its ability to sustain a large yield. For an evaluation of the east-

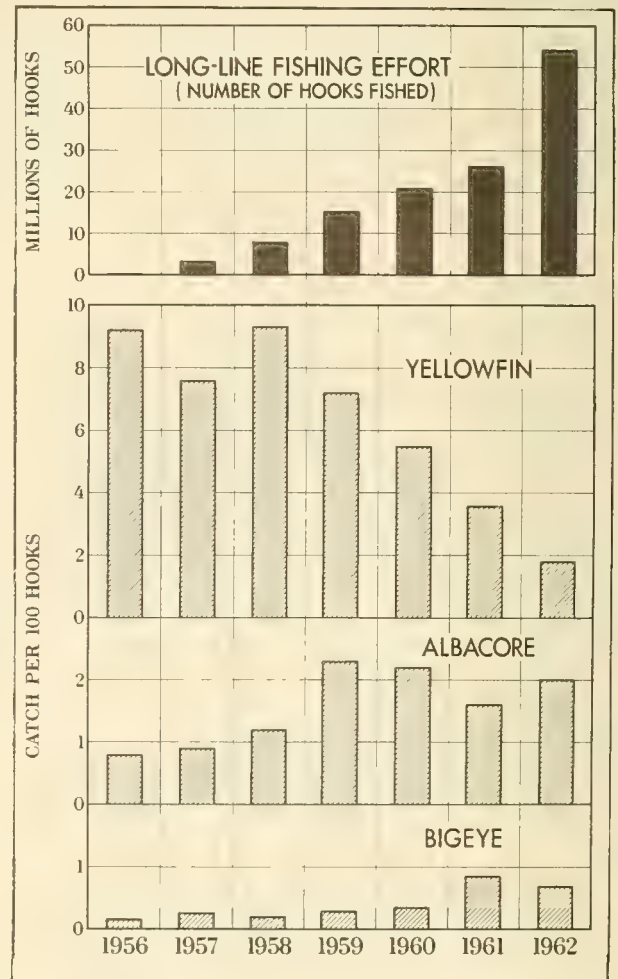


Fig. 6 - Trends in effort and catch per unit of effort in the Japanese long-line fishery.

ern Pacific yellowfin stock, Schaefer (1957) required detailed catch and effort data covering a number of years. Such data are presently not available for the Atlantic tuna fisheries. By accepting several general assumptions and by comparing landings made in the Atlantic and Pacific, a rough estimate of the magnitude of the Atlantic resource can be obtained. The following basic assumptions were made:

1. Tuna resources of the Pacific, except for yellowfin in the eastern tropical region, have not been overexploited. Therefore, landings of the five principal species in the Pacific for 1962 probably were less than the maximum sustainable yield of the Pacific stocks as a whole.
2. Environmental conditions in the two oceans are similar, as far as the tunas are concerned.

The present discussion is general and speculative. Hence, the figures for the ocean areas refer to the entire ocean. No attempt has been made to correct for variations in distribution of each tuna species. Sverdrup, Johnson, and Fleming (1942) indicate the size of the Pacific as 165,246,000 km.² and the Atlantic as 82,441,000 km.². The Atlantic is approximately 50 percent the size of the Pacific. Thus, we can assume that the potential yield of the Atlantic resource is 50 percent of the yield from the Pacific.

Figure 7 shows annual landings of the five species from the Atlantic in 1963 and the Pacific in 1962. On the basis of the assumptions made, the following comparisons and estimates can be made from the catch data:

1. Exploitation of yellowfin in the Atlantic has not reached the same level as in the Pacific. The Atlantic catch of 67,400 tons represents about 42 percent of the Pacific landings of 159,100 tons.

2. The Atlantic albacore landings of 74,500 tons represent approximately 82 percent of the Pacific landings of 91,300 tons. On the basis of area, albacore are being caught at a greater rate in the Atlantic than in the Pacific. The Atlantic landings have exceeded the estimated minimum potential yield; it is possible, however, that the albacore resource in the Pacific has not yet been fully exploited.

3. The Atlantic bluefin landing of 23,400 tons in 1963 is approximately 43 percent of the Pacific landing of 54,600 tons; the Atlantic bluefin catches probably can be increased. As pointed out in the discussion of this species, however, the landings of earlier years (1952-55) exceeded those of the more recent years (1959-63). The highest annual landing since 1950 was 36,400 tons landed in 1955. This take is approximately 67 percent of the 1962 Pacific landing. F. Mather (personal communication) has obtained a high rate of return of tagged bluefin tuna in the Northwest Atlantic. This high return suggests the possibility of overfishing. Whether the bluefin stock is being overfished will require further research.

4. Atlantic landings of bigeye tuna were considerably less than in the Pacific. The Atlantic catch of 13,300 tons was only about 12 percent of the Pacific catch of 106,000 tons. The fishery for bigeye in the Atlantic probably is not taking the maximum potential yield.

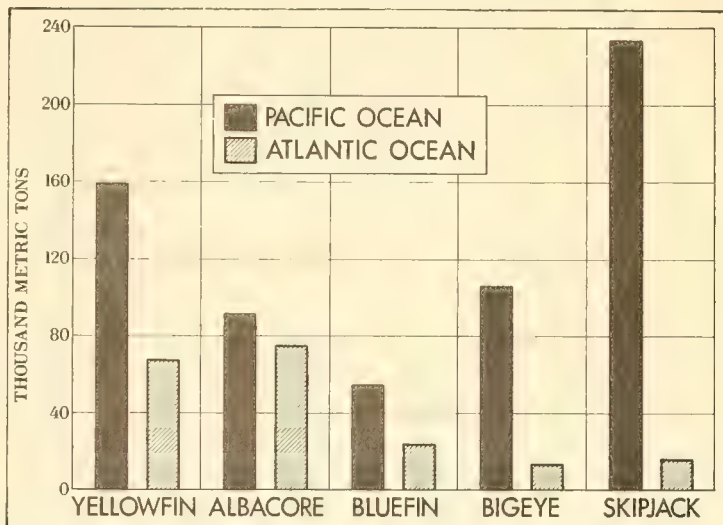


Fig. 7 - Landings of five tuna species from the Pacific (1962) and Atlantic (1963).

5. Skipjack represent the largest undeveloped tuna resource in the Atlantic. Since the magnitude of the Atlantic landings of yellowfin and bluefin tunas are comparable to Pacific landings per unit area, it seems unlikely that there are limiting factors in the Atlantic which would make for a relatively small skipjack resource in this ocean. The Atlantic skipjack catch of 16,700 tons represents only 7 percent of the total Pacific landing of 234,100 tons. Atlantic skipjack catches must increase sevenfold to correspond, area for area, to Pacific landings. The Atlantic skipjack fishery should yield at least 117,000 tons. We might assume that this figure is a minimum estimate, for it is generally believed that skipjack in certain parts of the Pacific are still underexploited.

ACKNOWLEDGMENTS

A number of people provided data and advice on the material presented in this report. Mr. Robert C. Wilson, U. S. Department of the Interior, Bureau of Commercial Fisheries, Washington, D. C., provided information on the Northwest Atlantic purse-seine fishery and the African surface tuna fishery. Dr. K. Tiews reviewed an early draft of this manuscript and provided valuable information and data on the bluefin tunas of the Atlantic. Finally, my colleagues at the Nankai Regional Fisheries Research Laboratory in Kochi, Japan, and at the Fisheries Agency in Tokyo, Japan, assisted in the completion of the section on the Japanese long-line fishery.

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CLAM-CORN GRIDDLE CAKES

CLAM-CORN GRIDDLE CAKES

- | | |
|---------------------------|------------------------------|
| 2 cans (7½-ozs. each) | 1½ cups clam liquor and milk |
| minced clams | 2 eggs, beaten |
| 1½ cups sifted flour | ⅓ cup melted fat or oil |
| 1 cup yellow corn meal | Butter or margarine |
| 5 teaspoons baking powder | Cran-applesauce |
| 1 teaspoon salt | |

Drain clams, reserving liquor. Sift dry ingredients together. Add remaining ingredients except butter and Cran-applesauce. Stir only until blended. Drop ¼ cup batter onto a hot, well-greased griddle or fry pan. Fry 1 to 2 minutes or until brown. Turn carefully and fry 1 to 2 minutes longer or until brown. Serve with butter and Cran-applesauce. Makes approximately 18 griddle cakes. Serves 6.

CRAN-APPLESAUCE

- | | |
|----------------------|---------------------|
| 1 can (1 lb.) jelled | ½ cup applesauce |
| cranberry sauce | ¼ teaspoon cinnamon |

Combine all ingredients and blend thoroughly. Chill. Makes approximately 2 cups sauce.



This recipe developed by home economists of the Bureau of Commercial Fisheries is from a 19-page, full-color, cookery booklet (Top O' the Mornin' with Fish and Shellfish, Test Kitchen Series No. 15) recently released by the Bureau of Commercial Fisheries, U. S. Department of the Interior. For 25 cents you can buy a copy from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20240.

PACIFIC HAKE (MERLUCCIIUS PRODUCTUS) AS RAW MATERIAL FOR A FISH REDUCTION INDUSTRY

By John A. Dyer*, Richard W. Nelson*, and Harold J. Barnett**

ABSTRACT

Pacific hake can be processed successfully into fish meal and oil with carefully selected equipment of conventional design for fish reduction. High efficiency in harvesting and processing this resource will be essential to a profitable operation.

INTRODUCTION

GENERAL: Pacific hake (Merluccius productus) has been found in commercial quantities off the coasts of California, Oregon, Washington, and British Columbia. This fact can be important to the Pacific Coast fish-reduction industry which has been reduced to a small fraction of its former size as the result of the decline in abundance of industrial species. The need to establish a productive hake fishery is emphasized even further by the fact that United States imports of fish meal have increased from 45 to 210 percent of domestic production in the past 5 years.

The Department of the Interior's Bureau of Commercial Fisheries is cooperating with the fishing industry in trying to fill this need. Development work with midwater trawl methods and equipment, and extensive but still incomplete survey work on the hake population, conducted by the Bureau's Exploratory Fishing and Gear Research Base at Seattle^{1/}, are beginning to provide a basis for a revived fish-reduction industry on the Pacific Coast. This report is an evaluation of what has been learned to date of the possibilities for Pacific hake for reduction by present commercial methods and supplying the existing markets for fish meal, oil, and solubles.

PACIFIC HAKE RESOURCE: Research on the potential hake fishery is being carried out jointly by the Bureau's Exploratory Fishing and Gear Research Base and the Bureau's Biological Laboratory at Seattle. Information is being sought on the extent of the hake resource, its productive capacity, optimum fishing periods, and the best fishing practices for maximum sustained yield. Preliminary surveys indicate that Pacific hake (Merluccius productus) are found in commercial quantity from Baja California, Mexico, to British Columbia, Canada. Intensive but limited surveys off the coasts of Washington and Oregon in 1964 found some schools of hake numerous and large enough to sustain a fish-reduction industry of modest size. Available schools are defined for this article as being those found at depths of 40 to 60 fathoms that can be fished successfully with the Cobb pelagic trawl. The hake off Washington and Oregon appear to school sufficiently for commercial fishing



Fig. 1 - Hake from Puget Sound being unloaded by pump.

from May or June through October or November, making this fishery a potential summer and fall operation.

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^{1/}"Construction and Operation of Cobb Pelagic Trawl--1964," by Richard L. McNeely, Leonard J. Johnson, and Charles D. Gill, Commercial Fisheries Review, October 1965, pp. 10-17 (also Separate No. 743.)

U. S. DEPARTMENT OF THE INTERIOR
Fish and Wildlife Service
Sep. No. 763

Large populations of hake are found to spawn off the coast of California in much deeper water. This apparently greater potential hake fishery off California is not included in this report since the required summer and fall surveys have not been made and the combination of effective gear and methods for harvesting has not been determined.

UTILIZATION: The possibility of using Pacific hake in both food and nonfood products has been the object of some preliminary investigation by the Bureau's Technological Laboratories at Seattle (Washington) and College Park (Maryland). The products being considered are fresh or frozen fillets, frozen blocks of fillets, pet food, mink food, fish protein concentrate, and industrial products (fish meal, oil, and solubles). Since markets for the industrial products are established and strong at this time and, in our judgment, the meal, oil, and solubles from hake could be established in these markets in a short time, our first effort is in the direction of reduction.

HAKE REDUCTION

The reduction of Pacific hake into fish meal, oil, and solubles is being investigated in cooperation with the fish-reduction industry in Oregon, Washington, and British Columbia. That area was chosen because of the large concentrations of hake found there to date in available schools and because a relatively complete cross-section of the existing types of commercial reduction plants that might process hake are located there.

PACIFIC HAKE (MERLUCCIIUS PRODUCTUS) AS A RAW MATERIAL: The characteristics of Pacific hake as a raw material for reduction are shown by the proximate analyses in table 1. In 1964, the hake caught in spring and early summer were low in fat content, in the range from 1 to 3 percent. In the late summer and through the fall, the fat content rose to a range of 4.5 to 6 percent. At about the same time, the crude protein rose slightly from about 14 percent early in the season to about 15 percent in the fall. This same pattern appears to be developing in 1965.

Judging from the current meager data on composition and availability, August through November would be the most profitable months for processing hake, based on the increased oil and protein content. The termination date would depend on the dissipation of the dense schools of hake in the late fall. A more comprehensive article on Pacific hake as a raw material is in preparation at the Seattle Technological Laboratory.

PROCESSING: Pacific hake can be converted to meal, oil, and solubles by conventional methods used for large-scale reduction of fish. This method is the wet-rendering process in which the fish are cooked by direct or indirect steam, pressed to remove oil and water, and the solid press cake dried in a rotary dryer. The mixture of oil and water removed after cooking is separated by centrifuging, and the water phase is evaporated down to 40 or 50 percent soluble solids (solubles). These solubles are added back to the press cake before entering the dryer.

Figure 2 shows a material balance approximating what one would expect in a conventional fish-reduction plant processing hake in the fall. In the spring and early summer, this chart would be altered by the lower fat content of the hake (around 2 percent) and the slightly reduced protein content. A typical operation on 1,000 pounds of the spring hake processed through the same plant would produce little or no oil and about 211 pounds of whole meal (solubles are dried as part of the meal) assaying 67 percent crude protein, 9.5 percent fat, and 10 percent moisture. This might permit the reduction of hake in the spring in a plant without equipment for removing oil. However, as the fat content of the hake rose above 2 percent, the fat content of the meal would rise above 10 percent. Consequently the meal would be degraded as an oily meal in the larger markets for fish meal. Equipment for separating, clarifying, and handling of oil is recommended for improvement of the meal quality and as a source of income from the oil.

Table 1 - Proximate Analyses of Pacific Hake (*Merluccius productus*) Taken off the Coasts of Oregon and Washington

Season	Moisture	Oil	Protein	Ash
	(Percent)			
Spring 1964	81.5	1.5	14.3	3.2
Summer and Fall 1964	77.7	5.2	15.0	3.0
Spring 1965	80.3	2.4	14.0	3.2

Note: These data are seasonal averages based on 14 samples.

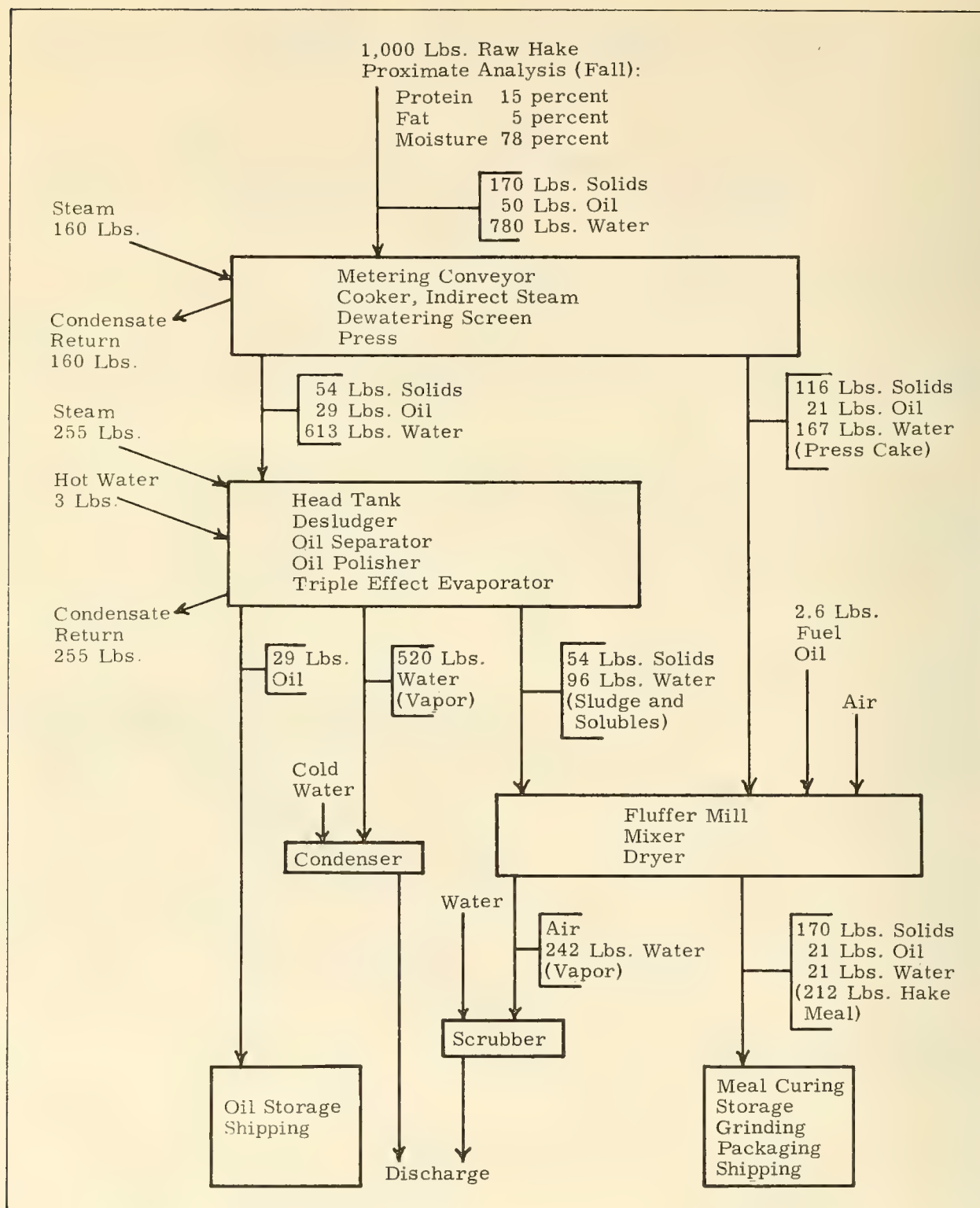


Fig. 2 - Material flow diagram for reduction of Pacific hake in the fall.

One characteristic of Pacific hake is its tendency to cook to a soft mushy consistency in an industrial cooker. This was a cause of concern on our part and led to a series of plant tests to evaluate the resultant problems in pressing and in processing in general.

COMMERCIAL PLANT TESTS: A series of cooperative plant tests have been run in three reduction plants in the Pacific Northwest with the hake being supplied by the Bureau's exploratory vessels. The amount of fish was too small in relation to plant capacity to produce reliable quantitative yield information. However, the information developed on process characteristics is included here because it is the best we have on Pacific hake.

Hake requires cooking at a lower temperature than is normal in fish reduction. Overcooking produces a press feed material of mushy consistency. This mushy material has a severe tendency to jam the press. Under even the best cooking and pressing conditions we have observed so far, the fish press cake has been pressed to a moisture content no lower than 63 percent. Thus we have much to learn before the cooked fish can be pressed down to a normal 50 to 55 percent moisture, or it may develop that hake is one of those species so difficult to press that a wetter press cake must be accepted. Certainly, any press equipment installed should be selected for maximum efficiency on moisture-retentive material and should have the best possible provision against jamming. Hake may present a challenge to the ingenuity of equipment manufacturers.

Another problem expected in production of hake meal will be the curing after drying. The iodine value of hake oil is high enough (around 160) to lead one to expect heating of the meal after drying. This heating may be severe enough to require special curing facilities such as equipment for addition of antioxidants and for turning and aerating the fish scrap. So far, none of the test runs have produced large enough volumes of meal to permit us to check this question.

The recovery of soluble protein from the press liquids is essential in the processing of hake. In the semiquantitative tests run so far, the proportion of fish solids found in the press water (stickwater) after desludging was about 22 percent of the solids content of the raw fish. This proportion will probably increase as press efficiency is improved. This represents too much of the raw fish to be lost. Also, recovery of solubles will eliminate a serious water pollution problem. The usual recovery system for solubles from press liquor, the triple effect evaporator, works well on acidulated stickwater from hake. With current market conditions, provision should be made for mixing the fish solubles back into the press cake ahead of the dryer for the production of "whole" meal. Oil-yield data were particularly unreliable in these tests because of the small percentage of fat in the relatively small plant runs. However, in one case where oil was not removed in a late summer test, the resultant meal assayed 21 percent fat. The conclusion is that the separation of oil is essential in such cases.

In general, the plant tests run to date indicate that conventional fish-reduction equipment carefully selected for application to the processing characteristics of hake will work reasonably well on hake reduction. Since hake is one of the more difficult fish to process, this same equipment should work well on herring, tuna scrap, sardine, and "scrap" fish. Although plant tests run so far have not been sufficiently quantitative to supply reliable yield data, the reduction products have been a source of reportable data.

HAKE MEAL: Whole meal and oil produced from Pacific hake in commercial reduction plants have been examined by this and other cooperating laboratories. The proximate analyses of the meal are shown in table 2.

The quality of the protein of Pacific hake meal was evaluated by the Bureau's Technological Laboratory at College Park, Maryland.

Table 2 - Analyses of Hake Meal from Plant Tests				
Date	Proximate Composition			
	Moisture	Oil	Protein	Ash
	(Percent)			
September 1964	9.1	21.8	63.7	9.3
October 1964	5.4	15.0	68.7	13.4
May 1965	9.2	10.2	65.0	18.1
July 1965	9.0	10.7	70.0	14.0
	7.1	13.5	67.5	15.3
	9.1	17.2	61.9	15.0

Note: Analyses were by the methods of the Association of Official Agricultural Chemists (1960).

They report that two samples from commercial plant test runs were fed to chicks on a comparative basis with four other proteinaceous materials of various qualities. The chicks were fed for 21 days on the test materials as a sole source of protein to supply a 15-percent level of protein in isocaloric diets in which calcium and phosphorus contents were kept constant at 1.50 and 0.88 percent, respectively.

Table 3 - 21-Day Chick Test Showing Protein Quality of Hake Fish Meals in Comparison with Different Fish Meals

Protein Test Material	Relative Growth Response	Average Body Weight
	Percent	Grams
Reference Protein Source No. 1 ^{1/}	100	354
Hake fish meal (B)	88	313
Fish meal "VP"	87	309
Hake fish meal (A)	81	286
Fish meal X	67	238
Reference Protein Source No. 2 ^{1/}	48	171

^{1/}The reference test diets and the fish meal test diets reported here are special diets each containing 15 percent protein from a single source. Thus, the data in the table are useful in determining the relative quality of the fish meals with each other and with the reference standards. However, the data have no value in determining the relative quality of proteins from fish meal and proteins from cereals when added to a practical high-efficiency ration in which the proteins are from mixed sources. Reference Protein Source No. 1 was soybean meal with 0.3 percent methionine added; Reference Protein Source No. 2 was soybean meal.

The protein fraction of three samples from test runs was assayed for amino acid composition. The results (table 4), show the ranges of concentrations found in these limited studies.^{2/}

Solubles are produced from hake stick-water by conventional acidulation and multiple effect evaporation techniques. Since current economic factors dictate inclusion of the solubles in the whole meal, the solubles were not evaluated separately.

HAKE OIL: The oils produced to date from short-run hake reduction tests were dark reddish (number 12 or 13 on the Gardner '53 scale). Their iodine values have assayed around 160. Saturated fatty acids comprise from 26 to 33 percent and polyunsaturated fatty acids (with 4, 5, or 6 double bonds) comprise about 15 to 19 percent of the total fatty acids according to gas-liquid chromatographic analyses. These preliminary data indicate that the use of hake oil in organic coatings would be worth investigating.

Soybean meal with and without the addition of 0.3 percent methionine was used as a standard for indicating protein quality of the extremes--that is, the superior versus the inferior. In addition to the two hake meals, a sample of fish meal identified as "VP" was tested. These three products were less than 2 months old when tested. For comparison, another fish meal "X," which had been kept at ambient room temperature for 12 months, was also included in this test. The results showing the 21-day average weight obtained from 30 chicks for each of the test materials are listed in table 3. Since the soybean meal diet containing the addition of 0.3 percent methionine was expected to and did result in the maximum growth (354 grams), it was set arbitrarily at 100 percent. All other groups were rated on a relative growth basis. On such a relative rating scale, Hake Meal A is average for a fish meal while Hake Meal B is very good.

Table 4 - Amino Acid Analyses of Protein from Pacific Hake Meal

Amino Acid	Percent Range ^{1/}	
	Minimum	Maximum
Lysine	7.9	8.6
Histidine	2.0	2.3
Arginine	6.3	6.8
Aspartic acid	9.7	10.3
Threonine	4.1	4.5
Serine	4.0	4.1
Glutamic acid	14.3	14.8
Proline	4.3	4.9
Glycine	6.6	7.8
Alanine	6.1	6.7
Valine	5.0	5.5
Methionine	3.0	3.3
Isoleucine	4.5	4.9
Leucine	7.4	8.0
Tyrosine	3.1	3.7
Phenylalanine	4.1	4.4

^{1/}Ranges from analyses of 3 samples of Pacific hake meal reported as percent of total protein.

ECONOMIC FACTORS

The economics of hake reduction should be considered in terms of spring and fall operations because of the change of chemical composition during the summer as discussed earlier. In the present early stage of our knowledge of the hake resource, the crude indications are that the hake school into fishable concentrations in May and disperse about November. The fat and protein content appear to rise through July and August and remain high through the rest of the season.

^{2/}Correspondence from Dr. Donald Snyder, Department of the Interior's Bureau of Commercial Fisheries Technological Laboratory, College Park, Maryland.

A reduction ratio (weight of raw fish processed to the weight of whole meal produced) of about 5.5 to 1 appears to be commercially practical from well-drained hake throughout the year. With calculations based on the average prices over the past 8 years of \$2.20 per ton unit of protein in the meal and 7.5 cents per pound for oil, a ton of spring hake should yield about 12.3 ton-units of protein at \$27.10 and no oil. (We are aware of the higher prices for fish meal and oil at the time of this writing but do not recommend judging a long-term investment on the basis of spot prices, particularly during or after a period of a steep rise in price.) In the fall, a plant with a good oil extraction system and solubles recovery should yield about 12.7 ton-units of protein worth \$28 and about 54 pounds of oil worth \$4.05 for a total product value of \$32.05. This low gross sales value of the products of reduction of a ton of hake calls for the utmost in efficiency and business management to cover sales and production costs such as brokerage fees; packaging; handling; plant operation and maintenance; unloading; amortization of plant equipment, building, and dock facilities; as well as a competitive price to the fisherman for the hake and, hopefully, some profit. Experimental fishing during the 1965 season indicates that like any other fishery, the hake fishery can have its lean periods. The size of the fishery is still open to conjecture, but based on the preliminary surveys by the Bureau's Exploratory Fishing and Gear Research Base, Seattle, and preliminary population studies by the Bureau's Biological Laboratory, Seattle, the schools of hake found off the coasts of Washington and Oregon are sufficient to support two reduction plants of 20-tons-per-hour capacity on a sustained yield basis. This estimate is subject to revision, since it is based on only five months of operation and an incomplete survey of the hake resource. However, this is the best information available at this early stage of the investigation.

SUMMARY

At the present stage we can see no great bonanza in a hake reduction industry; yet there is a good possibility for a paying operation. We have observed that a well engineered conventional fish-reduction plant will process hake in a satisfactory manner. This is still a pioneering period in which risk of capital is high. On the other hand, one waiting the years necessary for more complete development of information may find the fishery saturated with process capacity already established to or beyond the sustained yield potential. The only help we can give to management on whether and when to go into the hake-reduction business is for us to continue research where it is needed most, and to disseminate information as early as possible along with our evaluation of that information according to its stage of progress. Other considerations are: (1) the great hake populations off the coast of California at greater depths may become available through continued development of the midwater trawl techniques and more survey information; (2) research is underway on the evaluation of Pacific hake for the edible fish market in the forms of fresh fillets, frozen fillets, and frozen fish blocks; (3) considerable interest has been shown in hake by the manufacturers of frozen and canned animal foods; and (4) Pacific hake, because of its low fat content and excellent amino acid balance, is attractive as a source material for the manufacture of fish protein concentrate.

Any of the above potential uses for Pacific hake, if developed, could outbid the fish-reduction industry for the raw fish, so their progress should be watched. On the other hand, the market for fish meal and oil is here now and being supplied largely through imports; whereas, the other markets are either undeveloped or the suitability of hake for those markets is still in doubt. Consequently the reduction of hake into meal and oil would be the only route open into a seller's market at this time.

ACKNOWLEDGMENT

We wish to acknowledge the cooperation of members of the reduction industry in making the plant tests possible. The management and personnel of Bioproducts, Inc., Warrenton, Oregon; British Columbia Packers, Ltd., Steveston, British Columbia; and Grays Harbor Rendering, Elma, Washington, made their plants and skills available to us for test runs and observations on commercial processing of hake. The staff of the Department of the Interior's Branch of Commercial Fisheries Technological Laboratory at College Park, Maryland, made the protein evaluations reported here.



TRENDS AND DEVELOPMENTS

Alaska

RECORD KING CRAB CATCH IN 1965:

The 1965 king crab catch in Alaska exceeded 130 million pounds, 50 percent more than the 1964 catch of 87 million pounds, according to the Alaska Department of Fish and Game. The ex-vessel value amounted to about \$14 million and the primary wholesale value was more than \$30 million.



Washing fresh-caught king crabs on the deck of a factoryship.

The Alaska king crab fishery is probably growing faster than any other segment of the United States fishing industry. Since 1954, the catch jumped from less than 9 million pounds to become the second most important species in the Alaska commercial fishing industry--second only to salmon.

In 1965, approximately 1,500 fishermen, more than 300 vessels, and an estimated 20,000 pots were engaged in harvesting Alaska king crab. Each season increasing numbers of the more efficient vessels appear in the fishery and most of them are capable of annually landing over one million pounds of king crab.

The two main fishing areas, Kodiak and the Alaska Peninsula-Aleutian Islands, were credited with landings of 75 million pounds and 50 million pounds, respectively, in 1965.

Kodiak Island has 11 king crab-processing plants operating at the present time. Seven of these plants are within the City of Kodiak and require an estimated 40,000 crabs each day to maintain full operation.

When king crab are canned or processed as frozen meat, 80 percent or more of the crabs' landed weight becomes waste. In 1965, over 100 million pounds of king crab shells and gurry were thrown away.

The disposal of growing quantities of crab shells and waste has created serious problems for shore-based processing plants. The City of Kodiak in particular is being faced with a serious pollution problem. Some method of converting this waste material into salable products would substantially improve the economic well-being of the king crab industry and avoid an expensive pollution abatement program.

* * * * *

KING CRAB WORKSHOP HELD IN ANCHORAGE:

On February 28, the U. S. Department of the Interior's Bureau of Commercial Fisheries Technological Laboratory sponsored the third king crab workshop in Anchorage. The unanimous consensus of industry representatives at the meeting was that grade standards are premature at this time because the industry itself is not "standardized" enough to take this step. Instead, it was agreed that an industry-wide specification would be prepared, possibly under the auspices of the King Crab Quality Control and Marketing Board.

Following the standards discussion, research progress and technological problems of the industry were discussed. Waste disposal was added to the list of technological problems facing the industry (bluing, other color problems, liveholding, moisture control, etc.).

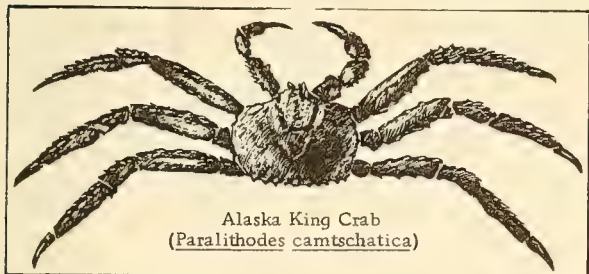
Discussion at the king crab workshop also emphasized that shell stock is fast becoming the largest volume king crab product, and that poor quality is much too evident. Production of shell stock is a very simple process and quality defects are principally the result of

poor selection of crabs and poor workmanship--problems particularly suitable for solution by a Quality Standard and Inspection Service.

* * * * *

RECORD SHIPMENT OF KING CRAB LEAVES ALASKA:

The largest shipment of king crab ever to leave Alaska was put aboard the SS Chena in early March. Altogether there were 49 refrigerator vans--14 of crab meat and 35 in shell--and 11 vans of canned king crab in the load. The Chena loaded its cargo at Sand Point, Squaw Harbor and Kodiak. This is the sec-



Alaska King Crab
(*Paralithodes camtschatica*)

ond shipment of king crab valued in excess of \$1 million to come out of Alaska. The former record load which arrived in Seattle in March 1965, consisted of 26 refrigerator vans of frozen and 6 vans of canned crab.



California

STATE ACCEPTS IRON GATE SALMON HATCHERY:

Iron Gate Hatchery was turned over to the California Department of Fish and Game by the Pacific Power and Light Company in a ceremony on March 22, 1966, at the hatchery.

Construction of the hatchery, located on the Klamath River upstream from Hornbrook, has been completed and the installation is in the process of being staffed.

The hatchery was built by the utilities company to compensate for the salmon and steelhead spawning and nursery areas that were cut off when Iron Gate Dam was built. The California Fish and Game Department will operate it and operation and maintenance costs will be shared by the Department and the Company. (California Department of Fish and Game, March 19, 1966.)



Cans--Shipments for Fishery Products, January-December 1965

A total of 2,989,241 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January-December 1965 as compared with 2,752,126 base boxes used during the same period in 1964. In 1965, there were increases in the U. S. canned pack of Maine sardines and Gulf shrimp.



Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area of 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.



Central Pacific Fisheries Investigations

TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 88 (January 6-13, 1966): The return of live yellowfin, skipjack, little tunny, and frigate mackerel to Kewalo Basin for density determinations was one of the main objectives of this cruise by the research vessel Charles H. Gilbert, operated by the Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory at Honolulu, Hawaii. The area of operation was within 100 miles of Oahu and Kauai.

Other objectives of the cruise were to (1) collect and return live scombrids to behavior tank facilities; (2) collect yellowfin, skipjack, little tunny; and frigate mackerel for red muscle size determination; (3) collect and return live bait to behavior tank facilities; (4) collect lenses from the eyes of scombrids for amino acid assays.

Thermograph and barograph recordings were made continuously. A standard watch for fish, birds, and aquatic mammals was maintained. Trolling lines were out continuously between Kewalo Basin and each fishing station. The total trolling time was 36 hours. A total of 19 little tunny (Euthynnus affinis), 14 yellowfin (Thunnus albacares), and 2 wahoo (Acanthocybium solandri) were caught.

Note: See Commercial Fisheries Review, April 1966 p. 22.



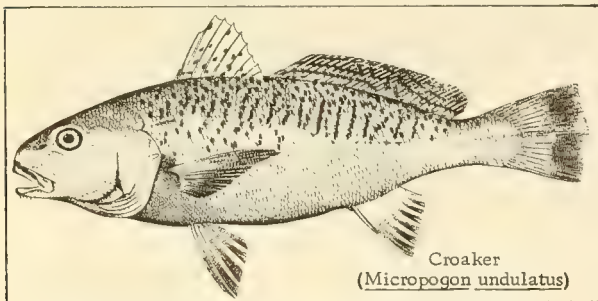
Chesapeake Bay

FRIGID WEATHER DESTROYS CROAKER CROP:

The possibility of a continued build-up of croaker populations in Chesapeake Bay experienced a serious setback during the extremely cold weather which clogged Virginia rivers with ice in late January and February 1966, according to the director of the Virginia Institute of Marine Science.

The head of the Institute's fish research reported that during a trawl cruise in search of young croakers in York River on February 11, no live fish were caught but many dead croakers were found in the river. During the December cruise young croakers were found in abundance, and had they survived, this year's crop, added to the production of two reasonably good seasons which occurred in 1963/64 and again in 1964/65, would have helped bring back this important commercial and sport fish.

A record catch of croakers occurred in 1945 when over 55 million pounds were landed in Virginia. Such an abundance of fish is as unlikely to occur in the near future as is the record low production of 1963 when only 122,400 pounds were landed. The rapid drop in catch immediately following 1945 led fishermen to request the Institute's scientists to study the habits of this fish and to determine the cause of decline.



Scientists have methodically studied croakers, following their migrations into the Bay, checking the areas in which juveniles grow to "pinhead" size, and following their migration back to the ocean. Careful sampling of commercial catches has given considerable information about the age and size of fish being caught.

These studies indicate that fishing, either sport or commercial, was not the significant cause for the decreased production of croakers but that natural factors, chiefly weather

conditions in the waters they inhabit, have controlled population levels.

During the 1957/58 winter, a former staff scientist reported that many young croakers appeared in the York and Pamunkey Rivers in late fall, but that when areas where they had been abundant were again sampled following a period of severely cold weather, the croakers had disappeared. He theorized that they were victims of cold weather.

"We tested this theory by subjecting young croakers to gradually lowering temperatures in the laboratory," the fish research head stated, "and young fish died at temperatures less severe than those they were subjected to in York River in early February 1966. Water temperatures recorded at the Institute's pier dropped as low as 29.5° F. and were below freezing for part of eight consecutive days. During winter 1966 surveys we collected dead croakers from the river, giving further support to the theory."

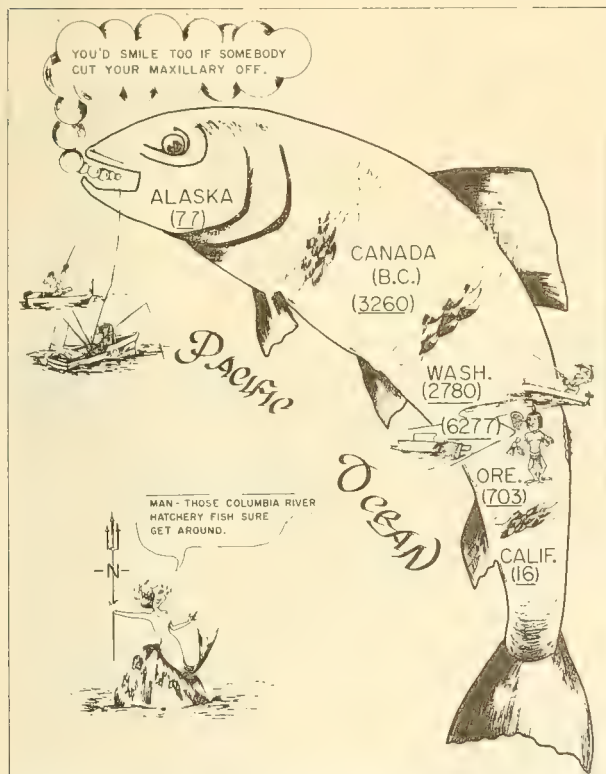
Some interesting facts gathered by scientists during the past ten years concerning the croaker population available to fishermen are: (1) croakers spawn in the Atlantic Ocean over the Continental Shelf from fall through early winter; (2) young croakers, sometimes no more than $\frac{1}{4}$ -inch long, are transported by bottom currents from the ocean up to brackish water; (3) if young croakers are present in the brackish waters up the rivers and Bay during extended periods of extremely cold weather, large numbers will not survive the cold; (4) young croakers use protected estuarine waters as nursery areas the first summer of their lives and return to the ocean in early fall; they may return to Chesapeake Bay the following spring, at which time they are barely market or sport size; (5) very few fish over five years old occur in the commercial catch.

According to the Institute, the effects on croaker fishing from the severe winter weather of 1966 will not be apparent before 1967 when the number of small sport or market fish appearing in the catch will be reduced. Croaker fishing for the summer of 1966 is expected to be better than in the past two years unless there was also a winter mortality of one- and two-year old fish at sea. Those fish that do appear in the catch should be larger than those caught in the last two seasons. The stock of croakers will continue to be well below the past 25-year average.

Columbia River

SALMON HATCHERY EVALUATION PROJECT SHOWS PROMISING RESULTS:

"Operation Fin Clip," a joint study by Federal and state agencies to measure the contribution to sport and commercial fisheries of fall chinook salmon raised in Columbia River hatcheries, is showing "significant and encouraging results," Interior's Bureau of Commercial Fisheries reported March 18, 1966.



Artist's conception of a fall chinook salmon simulating the Pacific Coast from Alaska to California shows numbers of marked fish recovered by commercial and sport fishermen in "Operation Fin Clip." Largest number of marked fish (6,277) were taken the past three years in the Columbia River. Next biggest catch was recorded off British Columbia (3,260). Other recoveries were 77 off Alaska, 2,780 off Washington Coast, 703 off Oregon Coast, and 16 off California.

Preliminary analysis of data obtained thus far in the mammoth evaluation program indicates Columbia River hatchery fall chinook of the 1961 brood appearing in the fisheries in 1963, 1964, and 1965, have contributed about 2.6 million pounds of fish, valued at more than \$1,500,000, to all fisheries.

The approximate cost of raising the fish in the hatcheries was about \$350,000, giving

a benefit-cost ratio of a little more than \$3.50 to \$1.

"Operation Fin Clip" has involved the marking of about 32 million young fish over a 4-year period. The Bureau, which provides financial aid for operation and maintenance of 21 state and Federal hatcheries on the Columbia River and its tributaries, launched the program in order to find out how much the hatcheries contribute to the total fish catch as a basis for determining whether to continue financing them.

"Operation Fin Clip" was inaugurated in 1962 with the marking of 1961 brood-year fish—that is, those fish hatched from adult salmon which had returned from the ocean to spawn in 1961. About 8 million fish, representing roughly 10 percent of each hatchery's production, were marked by excision of fins each year.

The first fish of the 1961 brood were recovered in 1963 as two-year-olds by sport fishermen at various points in the Pacific Ocean and in the Columbia River. Others were recovered by sport, commercial, and Indian fishermen in 1964 as three-year-olds and more in 1965 as four-year-olds. It is expected that recoveries of broods marked in 1963, 1964, and 1965 will continue into 1970.

Outside of the recoveries made in the Columbia River itself, the greatest number of marked fish were reported off British Columbia, indicating that Columbia River salmon contribute considerably to the fishery of Canada.



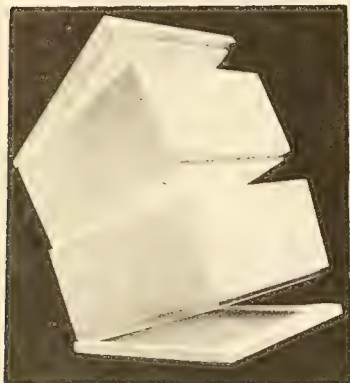
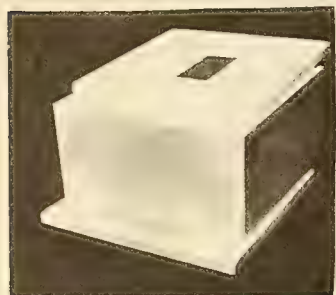
Containers

NEW FOAM BOX FOR TRANSPORTING LIVE TROPICAL FISH:

A modern high speed styrofoam molding plant now produces a newly designed patented styrofoam box for shipping live tropical fish. The plant is located at Palmetto, Florida.

The molding operation, situated on a fish farm, can produce about 2,500 boxes a day from the aluminum four-up mold. Both tops and bottoms of the box are molded four at a time. Special molding slugs are available so that the name of the shipper can be molded into the cover of the box to personalize the box with the name of the shipper.

The box, when used as a double pack, has a fitted cover which nests into the bottom of the box. Thus, when two boxes are shipped together, the bottom of the top box locks into



Two views of new foam box for transporting live tropical fish.

the top of the bottom box, eliminating the need for the cover of the bottom box. The cover is, instead, placed on the bottom of the lower box, thus giving the fishes added protection at the bottom of the box, where they need it most. A rim around the bottom of the cover, plus the runners on the bottom of the box, creates a dead air space as well as lifting the fishes another inch from the floor. This has proven to be such protection that a double pack can

be placed in a freezer and still hold the water temperature above 70° F. for almost 18 hours. The comparable "regular" box holds the temperature for only 5 hours. The price on the new patented box will be less than that of a regular box because of the savings in four-up molding. Standard boxes are made on one-up molds.

The firm is running the molding factory as a service to the tropical fish industry. It has not been created for profit, nor does it expect to prohibit other box manufacturers in Florida from making a similar box. Licensing arrangements are available to any manufacturer who cares to make a better box.



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES OF FRESH AND FROZEN FISHERY PRODUCTS, JANUARY 1966:

The Armed Forces are a major buyer of fresh and frozen fishery products. Purchases

of fresh and frozen fishery products for the Armed Forces in 1965 totaled about 28 million pounds with a value of about \$19 million. This represents an important market for the U. S. fishing industry.

In January 1966 purchases of fresh and frozen fishery products for the Armed Forces were up 46.5 percent in quantity and 3.1 percent in value from the previous month. The increase was due mainly to larger purchases of scallops, flounder fillets, ocean perch fillets, and haddock fillets and portions.

Principal Fresh and Frozen Fishery Products Purchased by Defense Personnel Support Center, January 1966 with Comparisons					
Product	January				Jan.-Dec. 1965
	1966		1965		Quantity Pounds
	Quantity Pounds	Avg. Cost Cents/Pound	Quantity Pounds	Avg. Cost Cents/Pound	
Shrimp:					
raw headless	52,000	106	89,700	97	1,150,650
peeled and deveined	34,000	144	103,080	137	1,953,510
breaded	177,950	92	361,400	89	4,973,274
molded and breaded	7,000	68	76,100	64	707,160
Total shrimp	270,950	100	630,280	95	8,784,594
Scallops	252,750	53	165,400	83	1,933,674
Oysters:					
Eastern	49,056	122	39,476	107	744,621
Pacific	25,550	89	38,244	79	272,814
Total oysters	74,606	111	77,720	93	1,017,435
Fillets:					
Cod	21,000	44	31,900	34	504,690
Flounder	356,500	39	388,450	32	2,909,600
Ocean perch	404,000	36	369,280	33	3,618,060
Haddock	220,500	39	126,100	39	1,544,455
Haddock portions	237,250	52	208,500	50	1,855,834
Steaks:					
Halibut	89,600	60	102,900	48	1,373,760
Salmon	11,360	69	5,000	72	168,640
Swordfish	500	68	540	59	5,030

Note: Data shown do not represent total fishery purchases for the Armed Forces. Only the main items purchased are shown.

Compared with the same month in the previous year, purchases in January 1966 were down 6.2 percent in quantity and 13.7 percent in value. Average prices were generally higher in January 1966 as compared with the same month in 1965.



Fish Spotting

EXPERIMENTS USING BALLOONS FOR SPOTTING FISH CONTINUED:

A series of feasibility tests with balloons has been conducted over the past year by the Department of the Interior's Bureau of Commercial Fisheries Laboratory at La Jolla, Calif., in an effort to develop ship-based aerostats for use in fish spotting and in directing the setting of purse seines. The use of shore-based aircraft for these purposes, although greatly enhancing tuna production, is costly

and available at only a few of the fishing spots. The use of aircraft has been on the decline, partly due to the shifting of the fishery offshore.

Results of the Tuna Resources Laboratory's tests with a tethered hot-air balloon in 1965 indicated that the operation of such balloons is feasible from the deck of a fishing vessel. The model available for testing, however, had a spherical shape and therefore was vulnerable to high winds. Further tests were necessary with aerodynamically-shaped balloons.

A more recent test used a small (200 cubic feet) helium-filled balloon of aerodynamic shape (Vee-Line), which was towed behind a vessel. This balloon gave satisfactory results. The Vee-Line balloon was chosen for this test for reasons of economy. The fact that it was small and helium-filled did not detract from useful observations of its aerodynamic properties.



Fig. 1 - Launching Vee-Line balloon from Tuna Resources Laboratory research vessel.

During the latter tests, advantage was taken of the 8-pound payload potential of the Vee-Line balloon. Experiments conducted along with its flight observations showed that

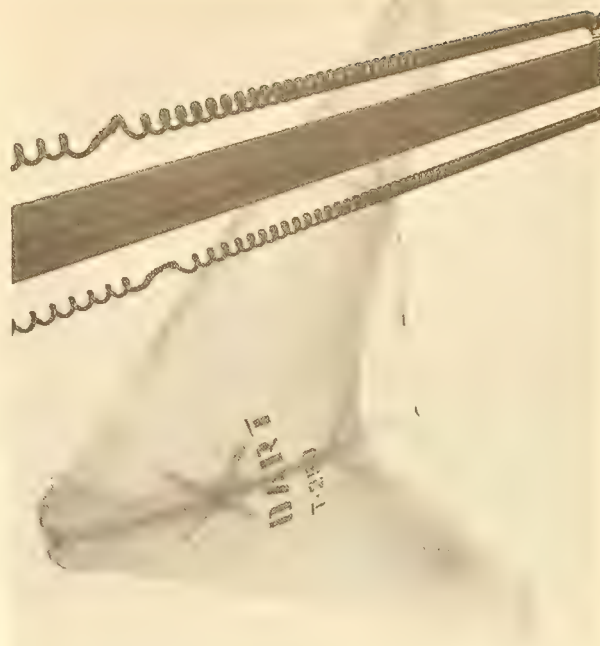


Fig. 2 - 200-cubic foot Vee-Line helium balloon riding above vessel.

small balloons of this type may also be useful in marine research by carrying aloft small instrument packages, such as the radio-controlled camera successfully used in one experiment, or sensor strings for oceanographic measurements, eliminating the "investigator effect" caused by the proximity to a vessel or other floating platforms. Further work, using a balloon, is contemplated following acquisition of a 400 cubic foot Vee-Line balloon.

Note: See Commercial Fisheries Review, May 1965 p. 18.



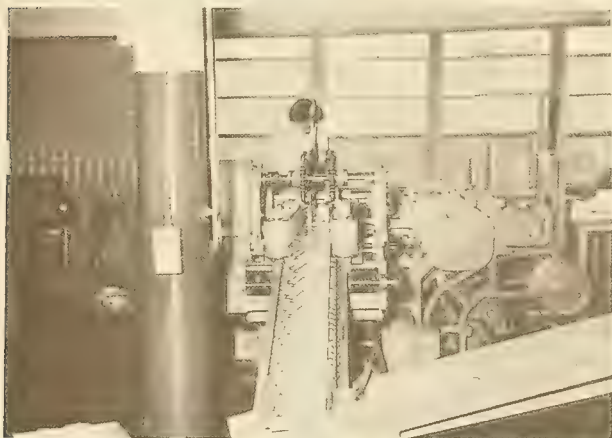
Fish Sticks and Portions

U. S. PRODUCTION, 1965:

United States production of fish sticks and portions during 1965 amounted to 221.7 million pounds valued at \$91.4 million--a gain of 23.3 percent in quantity and 37.3 percent in value as compared with 1964. Fish sticks totaled 82.3 million pounds in 1965--8.7 million pounds or 11.8 percent higher than 1964, and fish portions amounted to 139.4 million pounds--up 33.1 million pounds or 31.2 percent.

Cooked fish sticks (77.2 million pounds) made up 93.9 percent of the 1965 fish stick

total, while the remaining 5.1 million pounds or 6.1 percent consisted of raw fish sticks. A total of 139.4 million pounds of breaded fish portions (of which 105.5 million pounds were raw) and 2.6 million pounds of unbreaded portions were processed during 1965.



Packaged fish-stick consumer-size packages coming off the overwrapping machine.

Table 1 - U. S. Production of Fish Sticks by Months and Type, 1965 1/

Month	Cooked	Uncooked	Total
	..... (1,000 Lbs.) ..		
January	6,524	278	6,802
February	6,259	261	6,520
March	7,557	513	8,070
April	6,045	367	6,412
May	5,027	443	5,470
June	6,510	303	6,813
July	4,911	431	5,342
August	6,203	401	6,604
September	6,903	535	7,438
October	7,364	483	7,847
November	7,085	525	7,610
December	6,843	511	7,354
Total quantity: 1965 1/	77,231	5,051	82,282
1964	67,810	5,764	73,574
	..... (\$1,000). ..		
Total value: 1965 1/	33,698	2,003	35,701

1/Preliminary.

Table 2 - U.S. Production of Fish Sticks by Months, 1961-65

Month	1/1965	2/1964	1963	1962	1961
	..... (1,000 Lbs.) ..				
January	6,802	7,226	7,554	6,082	6,091
February	6,520	7,062	8,241	6,886	7,097
March	8,070	6,965	8,053	7,658	7,233
April	6,412	5,871	6,546	5,719	5,599
May	5,470	5,661	5,750	5,643	5,129
June	6,813	4,221	6,125	5,117	4,928
July	5,342	3,815	4,870	3,740	3,575
August	6,604	6,310	5,696	5,760	6,927
September	7,438	6,482	5,865	6,582	5,206
October	7,847	7,029	8,128	6,698	6,133
November	7,610	6,153	6,471	6,305	6,288
December	7,354	6,779	6,003	6,027	5,618
Total	82,282	73,574	79,302	72,217	69,824

1/Preliminary.
2/Revised.

Table 3 - U.S. Production of Fish Sticks by Areas, 1965 and 1964

Area	1/1965		1964	
	Firms No.	Quantity 1,000 Lbs.	Firms No.	Quantity 1,000 Lbs.
Atlantic Coast States ..	25	64,866	23	57,375
Inland & Gulf States ..	7	8,639	8	8,276
Pacific Coast States ..	10	8,777	14	7,923
Total	42	82,282	45	73,574

1/Preliminary

Table 4 - U.S. Production of Fish Portions by Months, 1965 1/

Month	Cooked	Breaded Uncooked	Total	Unbreaded	Total
	..... (1,000 Lbs.) ..				
January	2,434	6,876	9,310	197	9,507
February	1,909	6,479	8,388	180	8,568
March	2,950	9,414	12,364	349	12,713
April	2,260	8,208	10,468	196	10,664
May	1,725	8,626	10,351	233	10,584
June	1,648	9,516	11,164	179	11,343
July	2,010	7,952	9,962	105	10,067
August	3,311	10,693	14,004	139	14,143
September	3,201	9,398	12,599	235	12,834
October	3,794	9,925	13,719	343	14,062
November	2,921	9,547	12,468	151	12,619
December	3,194	8,849	12,043	291	12,334
Total qty. 1965 1/	31,357	105,483	136,840	2,598	139,438
Total qty. 1964	20,956	82,816	103,772	2,541	106,313
	..... (\$1,000). ..				
Total val. 1965 1/	13,154	41,521	54,675	982	55,657
Total value 1964	8,667	26,955	35,622	910	36,532

1/Preliminary.

Table 5 - U.S. Production of Fish Portions by Areas, 1965 and 1964

Area	1/1965		1964	
	Firms No.	Quantity 1,000 Lbs.	Firms No.	Quantity 1,000 Lbs.
Atlantic Coast States ..	26	87,443	26	63,955
Inland & Gulf States ..	10	48,992	13	39,662
Pacific Coast States ..	9	3,003	11	2,696
Total	45	139,438	50	106,313

1/Preliminary.

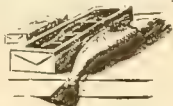
Table 6 - U.S. Production of Fish Portions by Months, 1961-65

Month	1/1965	2/1964	1963	1962	1961
	..... (1,000 Lbs.) ..				
January	9,507	8,877	8,173	5,077	4,303
February	8,568	8,497	7,361	6,360	4,902
March	12,713	8,761	8,835	7,036	5,831
April	10,664	8,016	7,919	6,408	4,484
May	10,584	7,621	7,293	5,818	3,879
June	11,343	7,672	8,774	6,137	4,039
July	10,067	6,599	4,524	4,679	3,962
August	14,143	9,398	6,684	6,687	4,963
September	12,834	9,830	9,621	7,180	5,745
October	14,062	11,123	9,877	9,871	6,759
November	12,619	10,922	8,136	7,406	5,789
December	12,334	8,997	7,447	6,019	5,191
Total	139,438	106,313	94,644	78,678	59,847

1/Preliminary.
2/Revised.

The Atlantic Coast was the principal area in the production of both fish sticks and fish portions with 64.9 and 87.4 million pounds, respectively. The Pacific Coast States were next with 8.8 million pounds of fish sticks but

the inland and Gulf States were second with 49.0 million pounds of fish portions.



Industrial Fishery Products

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January 1966:
Based on domestic production and imports, the United States available supply of fish meal for January 1966 amounted to 18,147 short tons--656 tons (or 3.5 percent) less than during the same month in 1965. Domestic production was 49 tons (or 1.8 percent) higher, but imports were 705 tons (or 4.4 percent) lower than in January 1965. Peru continued to lead other countries with shipments of 8,253 tons.

U. S. Supply of Fish Meal and Solubles, January 1966			
Item	January		Total
	1966	1965	1965
... (Short Tons) ...			
Fish Meal and Scrap:			
Domestic production:			
Menhaden	1/	1/	172,158
Tuna and mackerel	1,598	1,914	26,423
Herring	1/	244	12,050
Other	1,221	612	29,849
Total production	2,819	2,770	240,480
Imports:			
Canada	2,998	2,408	43,830
Peru	8,253	11,933	209,801
Chile	-	1,102	5,651
Norway	22	-	78
So. Africa Rep.	-	-	5,100
Other countries	4,055	590	6,206
Total imports	15,328	16,033	270,666
Available fish meal supply	18,147	18,803	511,146
Fish Solubles:			
Domestic production	1,169	907	93,853
Imports:			
Canada	129	100	1,488
Iceland	33	-	-
Other countries	-	500	3,650
Total imports	162	650	5,138
Available fish solubles supply	1,331	1,557	98,991

The United States supply of fish solubles during January 1966 amounted to 1,331 tons--a decrease of 14.5 percent as compared with the same month in 1965. Domestic production rose 28.9 percent and imports of fish solubles decreased 75.1 percent.

U. S. FISH MEAL, OIL, AND SOLUBLES:

Production by Areas, February 1966: Preliminary data as collected by the Department

of the Interior's Bureau of Commercial Fisheries:

U. S. Production ^{1/} of Fish Meal, Oil, and Solubles, February 1966 (Preliminary) with Comparisons			
Area	Meal	Oil	Solubles
	Short Tons	1,000 Lbs.	Short Tons
February 1966:			
East & Gulf Coasts	623	72	806
West Coast ^{2/}	1,747	258	724
Total	2,370	330	1,530
Jan.-Feb. 1966 Total	5,189	709	2,699
Jan.-Feb. 1965 Total	5,027	1,051	1,710

^{1/}Does not include crab meal, shrimp meal, and liver oils.
^{2/}Includes American Samoa and Puerto Rico.

Production, January 1966: During January 1966, a total of 2,819 tons of fish meal and 379,000 pounds of marine-animal oil was produced in the United States. Compared with January 1965 this was an increase of 49 tons

U. S. Production of Fish Meal, Oil, and Solubles, January 1966 ^{1/} with Comparisons			
Product	January		Total
	1/1966	1965	1965
.....(Short Tons).....			
Fish Meal and Scrap:			
Herring	2/	244	12,050
Menhaden 3/	2/	2/	172,158
Tuna and mackerel	1,598	1,914	26,423
Unclassified	1,221	612	19,349
Total 4/	2,819	2,770	229,980
Fish solubles:			
Menhaden	2/	-	72,948
Other	1,169	907	20,905
Total	1,169	907	93,853
... (1,000 Pounds) ...			
Oil, body:			
Herring	2/	163	7,767
Menhaden 3/	2/	2/	172,037
Tuna and mackerel	185	236	5,458
Other (incl. whale)	194	174	5,402
Total oil	379	573	190,664

^{1/}Preliminary data.
^{2/}Included in "unclassified" or "other."
^{3/}Includes a small quantity of thread herring.
^{4/}Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.

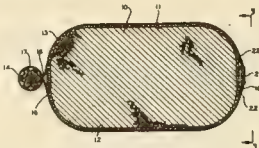
of fish meal but a decrease of about 194,000 pounds of marine-animal oil. Fish solubles production amounted to 1,169 tons--an increase of 262 tons as compared with January 1965.



Inventions

RING BUOY LIFE PRESERVER PATENTED:

A patent was recently granted on a plastic life preserver with foamed plastic cord covered with fiberglass or plastic material permanently colored international orange. (Meets U. S. Coast Guard and military requirements.) The inventor claims that it equals or exceeds the buoyancy of a cork buoy with only one-half the weight, and it will not rot or mildew. Patterns for four sizes are available. (U. S. Patent No. 3,095,586 issued Ludwig S. Baier, P. O. Box 158, Tolovana Park, Oreg. 97145.)



Marketing

EDIBLE FISHERY PRODUCTS, 1965 AND OUTLOOK FOR 1966:

No appreciable changes are foreseen in the supplies of edible fishery products for 1966. Total domestic landings probably will vary little from 1965 but imports likely will continue to rise. Import increases are expected for such major items as frozen shrimp, spiny lobster tails, ocean perch fillets, and the blocks and slabs of fillets from which sticks and portions are manufactured.

lets and steaks of flounder, haddock, and ocean perch, and less raw-headless shrimp in cold storage. Canned pink and chum salmon stocks were relatively low near the end of 1965 but stocks of canned red salmon were up substantially from a year ago.



Fig. 2 - Fishing trawlers tied up at Boston Fish Pier for unloading. At right in foreground is the New England Fish Exchange building.

Retail prices for fishery products averaged higher in the first quarter of 1966 than a year earlier, reflecting generally stronger demand conditions for meat and fish. Price increases were expected in both the fresh and frozen, and canned fish categories.

The quantity of edible fish available in 1965 set a record high of slightly over 5 billion pounds, up about 3 percent from 1964. On a



Fig. 1 - Attractive fresh fish display.

During the first quarter of 1966, supplies of a few popular frozen products were expected to be more plentiful than a year earlier. Cold-storage holdings of crabs, spiny lobster tails, breaded shrimp, and scallops were up as the year began, along with fish sticks and portions. There were fewer fil-

lets on round weight basis (as caught), imports contributed a record high 51 percent of the total. Substantially larger quantities of blocks of fish fillets and albacore tuna were imported in 1965 than a year earlier. In-shipments of both headless and peeled shrimp were up as were ocean perch fillets, flounder fillets, and sardines canned in oil.

Per capita consumption of fishery products during 1965 increased to 11.0 pounds (edible weight) from 10.5 pounds in 1964. Consumption of fresh and frozen fishery products in 1965 increased to 6.0 pounds per person and for canned fish to 4.5 pounds.

Note: This analysis was prepared by the U. S. Department of the Interior's Bureau of Commercial Fisheries, and published in the U. S. Department of Agriculture's February 1966 issue of the National Food Situation (NFS-115).



Michigan

CHANGES IN COMMERCIAL FISHING REGULATIONS:

Starting June 1, 1966, commercial perch fishing will be liberalized in Michigan waters of the Great Lakes under a new plan to promote better growth rates among those fish and to speed the turnover in their populations.

The relaxed regulations, aimed at improving perch fishing for sportsmen as well as commercial operators, was given final approval by the Michigan Conservation Commission.

Under changes adopted, size and weight limits will be removed for processed and "in the round" perch. Also, closed commercial seasons on those fish will be dropped except in a 50-mile stretch of Saginaw Bay and Lake Huron waters.

Commercial perch fishing will be off limits from June 10 through Sept. 10 in waters less than 18 feet deep between Point Au Gres and Harrisville. Purpose of the three-month closing is to curb conflicts between commercial and sport fishermen during the peak of the tourist season.

In other action taken, the Commission tentatively approved a ban on commercial fishing for northern pike in the Great Lakes.

The measure, which must be aired at public hearings before coming back to the Commission for final action, is in keeping with the Conservation Department's program to spur sport fishing in the big waters.

It is not expected to produce a spectacular increase in pike populations because there is no indication that commercial fishing has overexploited those fish.

While taking into account that pike are of only incidental importance to commercial operators, the proposed ban reflects the fact that anglers have a major interest in those trophy fish. (Michigan Department of Conservation, February 17, 1966.)

* * * * *

LAWMAKERS SEEK FUNDS UNDER ANADROMOUS FISH ACT OF 1965:

A joint legislative resolution of the Michigan legislative body, urging that Michigan receive maximum allotments under the new Federal fish program, was submitted in early March 1966 to a Congressional appropriations subcommittee.

The request is keyed to Government plans, authorized under an act of 1965, which call for allocating \$25 million in federal funds through mid-1970 to promote anadromous fisheries in the nation, Public Law 89-304.

A new project is under way by the Michigan Department of Conservation to introduce another anadromous fish--the coho salmon--in the Great Lakes.

The joint resolution presented to the Congressional subcommittee is focused on the coho project and the Michigan Department's plans to boost populations of steelheads and other anadromous fish in the Great Lakes. (Michigan Department of Conservation, March 10, 1966.)



North Atlantic Fisheries Explorations and Gear Development

TRAWL GEAR EVALUATIONS AND HADDOCK SURVEY:

M/V "Delaware" Cruise 66-1 (February 7-17, 1966): Comparative tows between the Department of the Interior's Bureau of Commercial Fisheries exploratory fishing vessel Delaware and similar class vessels using the standard No. 41 otter trawl, and terminal trials with the Atlantic Western Trawl, Model III, were the primary objectives during this cruise. Additional objectives achieved coincidentally with the gear trials were (1) the procurement and storing of live fish, frozen fish, and iced fish, and (2) the reporting (to U. S.

fishing vessels) by radiotelephone of commercial quantities of haddock found in areas north of Georges Bank.



Catch of 4,000 to 5,000 pounds of mixed groundfish, primarily haddock, taken with the Atlantic Western Trawl, Model III, during Delaware Cruise 66-1.

The No. 41 trawl used aboard the Delaware during this cruise was made up of the following materials and rigging:

Section	Material	Mesh Size
Top wing	Polyethylene	5"
Bottom wing	Manila	5"
Square	Polypropylene	5"
Lower belly	Manila	4 $\frac{1}{2}$ "
Top belly	Polyethylene	4 $\frac{1}{2}$ "
Extension	Polypropylene	4 $\frac{1}{2}$ "
Cod end	Nylon	4 $\frac{1}{2}$ "
Chafing gear	Cowhide	

The roller gear consisted of 20-inch diameter rubber rollers in the bosom, 18-inch diameter rubber rollers along 15 feet of wings from the quarter and 27 feet of rounded (rope wrapped) wire along the remainder of the wings. Fifty floats were secured to the head-rope: 20 were along the bosom and 15 were on each wing. Standard 10.5-foot doors weighing 1,250 pounds were used with 5-fathom legs and 10-fathom ground cables.

Six tows were made with the No. 41 net on Georges Bank in areas southeast of the "Leg" (in the "Winter Fishing Ground") and on the "Northern Edge." All tows were made in company with various Boston otter trawlers and Canadian vessels. Towing results were similar in yield to those vessels in the vicinity; time adjustments were applied when commercial vessels made longer tows. After

satisfactory comparative towing information was compiled with the No. 41 trawl, the net was removed and the Atlantic Western Trawl, Model III, was substituted.

The rigging data on the Atlantic Western Trawl, Model III, are:

Section	Material	Mesh Size
Wings	Polyethylene	5"
Square	Polypropylene	4 $\frac{1}{2}$ "
Bellies	Polypropylene	4 $\frac{1}{2}$ "
Extension	Polypropylene	4 $\frac{1}{2}$ "
Cod end	Nylon	4 $\frac{1}{2}$ " (double)
Chafing gear	Polypropylene strands (Hula Skirt)	

The roller gear consisted of 20-inch diameter rubber rollers in the bosom and 18-inch diameter rubber rollers along 15 feet of wings from the quarters. The remainder of the wing footrope was fitted with rubber discs. Thirty-six floats were secured to the head-rope: 20 along the bosom and 8 on each wing. Standard 10.5-foot doors weighing 1,250 pounds were used with 15-fathom legs.

The Atlantic Western Trawl was set 17 times in various areas off George Bank. The best concentrations of haddock encountered during this cruise were found when the Delaware was fishing alone northeast of Brown's Bank in 70 to 85 fathoms of water. Reports of these tows were broadcast by radio to two Boston-based vessels fishing on the southwest part of Brown's and the northwest edge of Brown's. These vessels were the only known U. S. vessels within immediate steaming distance of the Delaware.

The remaining areas in which the Atlantic Western Trawl was fished were northwest and west of Georges Bank. With the exception of one tow when 4,000 pounds of oceanperch were caught, the prevalent species encountered were haddock. The range in the yields during the remainder of tows with the Atlantic Western Trawl was consistent with commercial results at that time; the Delaware experienced spotty fishing which was in agreement with results of the fleet. The few times this net was fished within sight of other vessels its yields, based on radio reports, compared favorably with those of the other vessels.

The primary objectives of this cruise were realized both with the No. 41 trawl and the Atlantic Western Trawl. The Delaware was able to produce on a par with other vessels

using similar gear. Fishing trials indicated that replacement of the rounded wire sweep with rubber disc-covered wire and modification of the net by hanging the wing ends to the sweep and shortening the ground cables, when fishing the rougher bottoms, would reduce wing damage to some extent yet maintain good fishing characteristics with the No. 41 trawl.

The trials with the Atlantic Western Trawl indicated that this net has good fish catching qualities on fish both at or near the bottom. Minor difficulty in setting the net, due to its long sweep and the unfamiliarity of the crew with the net's construction details, were the most notable disadvantages experienced during this cruise. Evaluation of the trawl beyond this stage, as a commercial fishing unit, will require fishing trials aboard industry vessels in production operations. Two Atlantic Western Trawls, Model III and Model IV, of proper size for vessels of 700 hp. or greater and for 150 to 300 hp. are available for further cooperative evaluation projects.

Note: See Commercial Fisheries Review, November 1965 p. 30.



Oceanography

2ND ANNUAL OCEANOGRAPHIC AND MARINE SCIENCES MEETING:

The Marine Technology Society (MTS) will hold its 2nd Annual Conference & Exhibit in Washington, D. C., June 27-29, 1966.

Announcement of plans for the "1966 MTS Show" follows the successful symposium conducted by the Marine Technology Society and other technical societies in Washington in January 1966. Titled, "Man's Extension into the Sea," this two-day symposium drew more than 1,600 scientific and engineering people from across the country--double the original estimated attendance.

The theme of the June Conference & Exhibit is "Exploiting the Oceans." The three-day technical program will include more than 70 presentations by recognized authorities with emphasis on both opportunities and problems as industry and government expand and build to explore and use the vast resources of the world oceans. The four major subject areas are: (1) ocean floor minerals and chemical extracting, (2) fisheries and food from the sea, (3) legal aspects of explora-

tion and exploitation, and (4) new techniques and hardware for ocean research, survey, and underwater operations.

* * * * *

BUREAU'S RESEARCH VESSEL LAUNCHED:

The newest and largest vessel in the Bureau of Commercial Fisheries' growing research fleet, the Miller Freeman, was scheduled to be launched April 2, 1966, at the Lorain, Ohio, shipyards of the American Ship Building Company, according to Secretary of the Interior Stewart L. Udall.

The new vessel was assigned to the Bureau's Biological Laboratory in Seattle, Wash. The shakedown cruise planned to take it to Seattle via the St. Lawrence Seaway to the Atlantic Ocean, then through the Panama Canal to the Pacific.

The Miller Freeman will be used for high-seas oceanography and fishery research in the North Pacific and Bering Sea. Its size will permit extended cruises to the West Pacific. The vessel will also assist in carrying out provisions of the 1953 International North Pacific Fisheries Convention signed by the United States, Canada, and Japan. The Convention concerns both the catch and the conservation of halibut and salmon--and the research necessary to meet international agreements.

The \$3 million vessel is designed to carry a crew of 27, with additional quarters and facilities for 9 scientists. It is a 216-ft. stern ramp vessel, with a 42-ft. beam, powered by a 2,150-hp. diesel engine.

The vessel is named for Miller Freeman, Seattle conservationist and publisher, who died in 1955. He founded the publication Pacific Fisherman in 1903, which he dedicated to fishermen of the Pacific Coast. He devoted much of his energy to advancing international conservation of fishery resources.



Oregon

COHO SALMON TRANSPLANTS:

Some 30,900 adult coho (silver) salmon have been hauled from their home waters to new streams this season in an effort to make best

use of the spawn-ready fish, which are surplus to the needs of Oregon Fish Commission hatcheries. The big venture, in its second year of operation, is a joint effort of the Oregon Game Commission and the Fish Commission and marks the first mass use of this technique to expand the production of coho salmon. According to the Fish Commission hatchery chief, it has been found that coho salmon will spawn naturally in other than their natal streams if transplanted just prior to spawning time. The transplant of adult fish is started only after the egg requirements of hatcheries are assured and enough fish have been placed above racks on hatchery streams to take full advantage of whatever spawning grounds are available.

With the advent of increasing hatchery surpluses of coho salmon in recent years, other means had to be found to deal with the fish that would otherwise be wasted. The fish lift was conceived as the most immediate solution. One of the limiting factors in this program has been the shortage of suitably equipped trucks with which to haul adult salmon during the normal October through December migration period.

Even though planning started early for the massive transplant this past season, a frustrating delay in the arrival of fall rains held back the runs of migrating coho salmon. In early November when the rains finally did arrive, they triggered an explosion of coho that virtually swamped hatchery-holding facilities and exceeded the ability of the fish taxis to haul them out. This factor was mainly responsible for the reduction in fish hauled this year over last year when 38,000 cohos made the trips. Unfortunately the Christmas 1964 floods caused an inestimable amount of damage to the spawn deposited in the gravel of the transplant streams a year ago. If nature cooperates this season more production can be expected from the efforts. (Oregon Fish Commission, Feb. 21, 1966.)



Oysters

ARTIFICIAL PROPAGATION DISCUSSED AT OLYMPIA MEETING:

Oyster larvae can now be artificially grown the year round by comparatively simple methods, according to reports from a

meeting of oyster growers and marine biologists held in Olympia, Wash., by the Washington Department of Fisheries, March 8, 1966. However, stages from the spat, or young oyster, to an oyster of a size that can be put out on beds still present difficulties. There are indications that these difficulties may soon be solved, and it could be possible to produce commercial quantities of oyster and clam seed the year round to supply growers.

Featured speakers at the meeting included the former director of the Milford, Conn., shellfish laboratory of the U. S. Fish and Wildlife Service, a leader and innovator in the artificial propagation of bivalve seed. He spoke on the history of the artificial propagation of bivalve molluscs and told of the advances made in the past few years. He said that the new laboratory at Milford will include a school where oyster growers may study and participate in the work to become familiar with artificial propagation procedures.

A State of Washington fisheries biologist told of the experiments conducted in 1964 and 1965 at the Hoodspoint salmon hatchery in modified salmon rearing ponds on the artificial propagation of European oyster seed. He also told of the operation of a pilot plant for the production of oyster and clam seed that has been in use at the Pt. Whitney shellfish laboratory since 1958.

The Director of the Bureau of Commercial Fisheries shellfish laboratory at Oxford, Md., told of seed production procedures used at that laboratory. The Deputy Regional Director of the Bureau's Region I, gave his views of the future possibilities of the sale of Pacific Northwest oysters throughout the United States and world-wide. He said the recent decrease in air freight rates made it possible to ship fresh salmon to Paris and other European cities as a luxury item and that in the near future, there will be a market for American oysters in a prosperous Europe.

A question and answer period followed the reports, with the experts fielding questions from oyster growers, who seemed interested in the training that will be possible at the Milford laboratory. (Washington State Department of Fisheries, March 9, 1966.)



Salmon

U. S. PACIFIC COAST CANNED STOCKS, FEBRUARY 1, 1966:

On February 1, 1966, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 1,913,780 standard cases (48 1-lb. cans)--564,181 cases less than on February 1, 1965, when stocks totaled 2,477,961 standard cases.

Table 1 - Total Canner's Stocks of Pacific Canned Salmon, February 1, 1966			
Species	Feb. 1, 1966	Jan. 1, 1966	Dec. 1, 1965
. (No. of Actual Cases)			
King	87,321	109,284	123,126
Red	1,553,294	1,801,354	1,902,932
Coho	155,072	173,560	193,729
Pink	520,292	651,279	767,120
Chum	201,711	263,268	305,471
Total	2,517,690	2,998,745	3,292,378

On the basis of total stocks of 2,517,690 actual cases (consisting of cans of $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., 1-lb., etc.), red salmon accounted for 1,553,294 cases (mostly 1-lb. and $\frac{1}{2}$ -lb. cans) or 61.7 percent of the total canners' stocks

1965, the approximate opening date of the Pacific salmon packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

Shipments at the canners' level of all salmon species from July 1, 1965, to February 1, 1966, totaled 2,360,982 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,541,187 standard cases was 9.7 percent below the 1964 pack of 3,922,356 cases. By species, the new pack was made up of (1964 pack in parentheses); king, 95,503 standard cases (78,155); red, 2,013,077 cases (831,815); coho, 170,064 cases (202,610); pink, 951,688 cases (2,055,311); chum, 310,855 cases (754,465).

Data on canned salmon stocks are based on reports from U. S. Pacific Coast canners

Table 2 - Total Canners' Stocks on Hand February 1, 1966 (Sold and Unsold), by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
. (Actual Cases)						
48 $\frac{1}{4}$ -lb.	4,710	152,181	60,044	2,708	66	219,709
48 $\frac{1}{2}$ -lb.	75,554	532,232	60,557	168,650	41,264	878,257
48 1-lb.	6,760	865,160	27,751	336,663	154,747	1,391,081
12 4-lb.	297	3,721	6,720	12,271	5,634	28,643
Total	87,321	1,553,294	155,072	520,292	201,711	2,517,690

Table 3 - Canners' Shipments from July 1, 1965 to February 1, 1966, by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
. (Actual Cases)						
48 $\frac{1}{4}$ -lb.	9,490	272,867	64,794	5,785	1	352,937
48 $\frac{1}{2}$ -lb.	93,298	450,783	71,991	243,690	52,828	912,590
48 1-lb.	13,971	595,463	80,349	712,974	343,796	1,746,553
12 4-lb.	42	5,738	7,549	45,668	10,987	69,900
Total	116,717	1,324,851	224,683	1,008,117	407,612	3,081,980

on February 1, 1966; pink salmon accounted for 520,292 cases or only 20.7 percent (336,663 cases were 1-lb. talls). Next came chum (201,711 cases, mostly 1-lb. talls), followed by coho or silver (155,072 cases), and king salmon (87,321 cases).

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1,

who packed over 96 percent of the 1965 salmon pack. (Division of Statistics and Economics, National Canners Association, February 25, 1966.)

Note: See Commercial Fisheries Review, April 1966 p. 36.

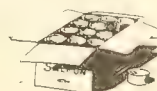


Table 3 - U. S. Production of Breaded Shrimp, 1955-65

Year	Quantity	Value
	1,000 Lbs.	\$1,000
1/1965	97,186	76,209
2/1964	91,333	63,388
1963	76,216	53,527
1962	76,803	62,230
1961	73,795	55,089
1960	70,348	47,015
1959	69,764	45,314
1958	60,865	43,622
1957	51,085	37,764
1956	50,888	37,301
1955	38,991	26,907

1/ Preliminary.

2/ Revised.

lion pounds, followed by the Atlantic States with 29.1 million pounds, and the Pacific States with 7.1 million pounds.

* * * * *

UNITED STATES SUPPLY AND DISPOSITION, 1963-65:

The available United States shrimp supply in 1965 was 10.0 percent higher than in 1964

U. S. Supply and Disposition of Shrimp, 1963-1965

Item	1/1965	2/1964	1963
. . . (1,000 Lbs., Shell-on). . .			
Supply--Heads-on weight:			
Domestic landings . . .	245,400	211,821	240,478
Foreign product of U.S. fisheries 3/	640	1,040	253
Imports 4/	284,617	269,651	266,205
Total supply (heads-on)	530,657	482,512	506,936
Disposition--Heads-on weight (approximate):			
Frozen:			
Headless	6/	289,593	283,271
Meat, raw (includes some cooked) 5/	6/	105,506	109,703
Meat, cooked 5/	6/	21,611	15,232
Breaded	98,000	91,841	76,700
Specialties 5/	6/	1,552	1,020
Total frozen 7/	425,410	405,182	398,978
Canned	68,780	43,058	68,272
Sun-dried	6,975	4,845	5,640
Fresh	26,000	25,000	27,000
Unclassified	3,492	4,427	7,046

1/ Preliminary.

2/ Revised.

3/ Caught by domestic craft, principally in waters off Central America, and shipped to the United States. Reported by the U. S. Bureau of the Census as "Products of the American Fisheries."

4/ The composition of imported shrimp includes estimates for 1963. Imports by commodities listed below were converted to heads-on weight by multiplying the quantity of headless shrimp by 1.59, raw meat by 2.04, cooked meat by 3.13, breaded by 1.00, canned by 3.21, dried by 7.69, and unclassified by 1.59.

Item	1965	1964	1963
. (1,000 lbs.)			
Shrimp			
Headless	114,324	112,149	111,717
Meat, raw	31,961	27,385	29,460
Meat, cooked	2,883	2,585	2,547
Breaded	778	508	484
Canned	2,248	3,004	4,120
Cured	407	404	274
Unclassified	(a)10,487	(b)8,541	2,923
Total	163,088	154,576	171,530

(a) Estimated to include headless 6,700,000 pounds and raw 1,800,000 pounds.

(b) Estimated to include headless 4,800,000 pounds and raw meat 1,200,000 pounds.

5/ May include some fresh products.

6/ Not available.

7/ The totals do not add and are less than actual totals because products frozen more than once were eliminated.

Note: To convert the weight of heads-on shrimp to heads-off, divide by 1.59, which will give approximate weight of heads-off shrimp.

and 4.7 percent higher than in 1963. United States shrimp imports again were at a record high in 1965, having increased 5.6 percent from the previous year and 6.9 percent from the 1963 imports.



Tuna

ATTRACTANT STUDY:

The effectiveness of various types of floating objects in attracting tuna is being tested in the Pacific Ocean off Central America. The Department of the Interior's Bureau of Commercial Fisheries Tuna Resources Laboratory, La Jolla, Calif., has chartered for 60 days the San Diego sportfishing boat HM-85, which left San Diego on March 5, 1966.



Scientist observes fishes associating with a floating tree in the open sea off Costa Rica.

Bureau scientists who boarded the boat when it arrived in Puntarenas, Costa Rica, hope to learn why fish are attracted to drifting materials at sea and to develop an object which will be efficient in attracting tuna and skipjack. The results of the studies could lead to the use of attractors by American tuna fishermen to concentrate tuna schools.

It is well known to tuna fishermen that yellowfin tuna, skipjack, and many other fish col-

lect near and beneath drifting logs, branches, seaweed, and other materials at sea. Fishermen usually inspect drifting material to look for schools of tuna, and set their nets around such objects when commercial quantities of fish are present. In one year, a total of 1,500 tons of yellowfin and skipjack tuna was caught by California fishermen in that manner. As many as 200 tons of tuna were captured from a single drifting log.

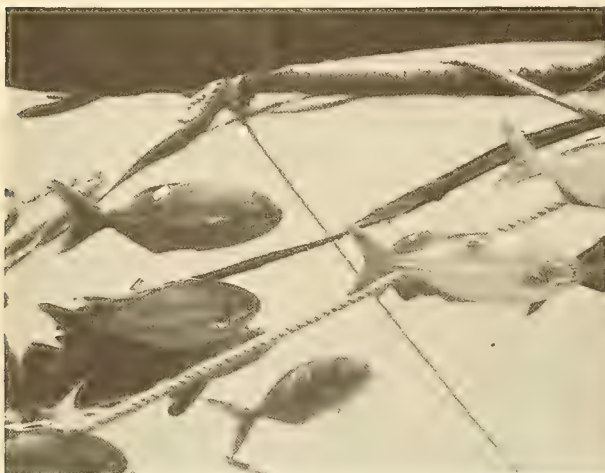


Fig. 2 - Community of fishes (primarily Kyphosids or sea chubs in this case) associating with flotsam. Note individuals tagged to determine movements between floating objects.

Fishermen of many other countries, including Japan, Indonesia, and India also take advantage of fish that collect beneath drifting materials at sea. Those fishermen moor rafts of bamboo, palm fronds, or other materials to attract fish.

At least a dozen floating objects differing in size, shape, and color will be moored in the waters off Costa Rica. They will include large objects fabricated from polypropylene cloth and with a surface area of 2,000 square feet, as well as smaller ones constructed of polyethylene cloth. Underwater, time-lapse cameras will be attached to the objects to obtain permanent photographic records of the fish which accumulate beneath the test objects. A small purse seine will be used to capture the smaller bait fish. Scientists also plan to tag individual fish to determine how long they will remain beneath an object, to make daily underwater estimates of the abundance of fish, and to record their behavior. According to a Bureau scientist, the major hazard is that sharks and marlin are also attracted to their objects as well as tuna. To avoid such hazards, a shark cage (for div-

ers, not for sharks) into which divers can flee when sharks or marlin appear has been built for the divers by a San Diego firm.



United States Fisheries

ANADROMOUS FISHERY PROGRAM PLANNED:

Plans to start a new Federal program were announced by Secretary of the Interior Stewart L. Udall to conserve and develop the Nation's anadromous fishery resources. Anadromous fish, such as striped bass, salmon and shad, live in the ocean and return to fresh water during the spawning season.

The program could provide funds for research, stream improvement, and construction of fishways, spawning channels, and hatcheries.

The Anadromous Fish Act of 1965, authorized by Public Law 89-304, will be administered jointly by Interior's Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife.

Although funds have not yet been approved by Congress, the Act authorizes the appropriation of \$25 million through June 30, 1970. The maximum Federal funds authorized for one year are \$5 million, and no state may receive more than \$1 million in one year. Federal funds would finance up to 50 percent of approved anadromous fish projects.

Both sport and commercial fishery resources are expected to benefit, and State agencies with jurisdiction over sport and/or commercial fisheries may enter into cooperative agreements with the Federal Government to carry out approved activities. States bordering the Great Lakes are eligible for funds for projects dealing with fish which leave the lakes to spawn in tributary streams. The Columbia River Basin--in Washington, Oregon, Idaho--is covered by another program and is excluded from the 1965 Act.

The Anadromous Fish Act provides for the participation of State fishery agencies and non-Federal interests--colleges, universities, associations, companies, and individuals--interested in helping to finance the projects.

Note: See Commercial Fisheries Review, January 1966 p. 48.



U. S. Vessels

ACCOMMODATIONS SURVEY:

A survey of accommodations on U. S. fishing vessels was conducted by the Interior Department's Bureau of Commercial Fisheries. Object of the survey was to determine to what extent those vessels could meet standards in the proposed draft Convention on Crew Accommodations on Board Fishing Vessels which will be up for adoption at the 50th International Labor Conference, Geneva, Switzerland, June 1-20, 1966.

The agenda of the Conference includes final consideration of a proposal for an international convention for minimum standards of accommodation on board fishing vessels. The proposed convention will very likely be adopted and sent to member nations for ratification.

The draft instrument which will be presented to the Conference for consideration would set mandatory minimum standards for crew accommodations aboard fishing vessels of 75 gross tons or more. Vessels from 25 up to 75 gross tons would be subject only when the national competent authority, after consulting with fishing vessel owners' and fishermen's organizations, determines that this is reasonable and practicable. Vessels which normally remain away from port for periods of less than 36 hours and in which the crew does not live on board would be exempt.

The draft instrument details specifications for sleeping rooms including size of bunks and lockers, sanitary accommodations including wash basins, tubs and/or showers, and specifications for galleys and mess rooms. These specifications would apply to all new or reconstructed fishing craft except the smaller exempt sizes.

The United States position on the proposed document has not as yet been finally determined. However, in discussions of this matter at the Conference, the Bureau desires that the U.S. delegation participate as actively as possible. In that connection the delegation desires information on the present status of fishing vessel accommodations in the United States fleet (i.e. vessels of 5 net tons or over).

In its survey the Bureau obtained information from a sample of about 800 vessels which is considered representative of the U. S. fishing fleet. Interviewers, staff mem-

bers of the Bureau, contacted vessel owners or other persons with knowledge regarding accommodations on board fishing vessels during the period March 21-April 9, 1966.

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NEW CUTTER COMMISSIONED FOR ALASKA DUTY:

The Coast Guard Cutter Confidence, the fourth of a new class of 210-foot rescue cutters, was commissioned February 19, 1966, at the Coast Guard Yard, Curtis Bay, Baltimore, Maryland.



A bow view of the new 210-ft. U. S. Coast Guard cutter, Confidence, taken at her mooring at the U. S. Coast Guard Yard, Curtis Bay, Md., before commissioning ceremonies on her flight deck commenced.

The Confidence is scheduled to be based at Kodiak, Alaska, where it will be used in law enforcement work as well as search and rescue. It was due to arrive at Kodiak in late May 1966.

The new cutter is equipped with a flight deck permitting landings and take offs of the Coast Guard's new turbine-powered "flying boat" rescue helicopters.

The Confidence has a capacity to tow ships up to 10,000 gross tons, and is equipped with twin propellers, each of which is powered by a combination diesel engine and gas turbine propulsion plant. It will have a sustained speed of 18 knots, and is designed to cruise for 5,000 miles at 15 knots.

The superstructure of the Confidence is arranged so as to permit 360-degree visibility from the bridge.

DOCUMENTATIONS ISSUED AND CANCELLED:

November 1965: During November 1965 a total of 51 vessels of 5 net tons and over was issued first documents as fishing craft as compared with 32 in November 1964. The number of documents cancelled for fishing vessels in November 1965 is not available.

U. S. Fishing Vessels 1/-Documents Issued and Cancelled, by Areas, November 1965 with Comparisons				
Area (Home Port)	Nov.		Nov.-Dec.	
	1965	1964	1965	1964
. . . . (Number). . . .				
<u>Issued first documents 2/:</u>				
New England	2	3	34	32
Middle Atlantic	1	1	14	10
Chesapeake	8	3	46	39
South Atlantic	8	7	68	46
Gulf	22	11	275	205
Pacific	10	5	167	135
Great Lakes	-	1	2	3
Hawaii	-	1	-	2
Puerto Rico	-	-	1	2
Total	51	32	607	474
<u>Removed from documentation 3/:</u>				
New England	4/	9	4/	51
Middle Atlantic	4/	2	4/	26
Chesapeake	4/	1	4/	29
South Atlantic	4/	5	4/	54
Gulf	4/	13	4/	95
Pacific	4/	13	4/	140
Great Lakes	4/	1	4/	13
Hawaii	4/	-	4/	-
Total	4/	44	4/	408

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.

2/There were 5 redocumented vessels in November 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 27 in 1965; 1 in 1964; 1 in 1962; 1 in 1961; 1 in 1959; 1 in 1956; 1 in 1954; and 18 prior to 1952.

3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.

Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

December 1965: During December 1965 a total of 56 vessels of 5 net tons and over was issued first documents as fishing craft as compared with 29 in December 1964. The number of documents cancelled for fishing vessels in December 1965 is not available.

U. S. Fishing Vessels 1/-Documents Issued and Cancelled, by Areas, December 1965 with Comparisons				
Area (Home Port)	Dec.		Jan.-Dec.	
	1965	1964	1965	1964
. . . . (Number). . . .				
<u>Issued first documents 2/:</u>				
New England	4	1	38	33
Middle Atlantic	-	1	14	11
Chesapeake	10	-	56	39
South Atlantic	9	4	77	50
Gulf	24	16	299	221
Pacific	8	6	175	141
Great Lakes	1	1	3	4
Hawaii	-	-	-	2
Puerto Rico	-	-	1	2
Total	56	29	663	503
<u>Removed from documentation 3/:</u>				
New England	4/	2	4/	53
Middle Atlantic	4/	1	4/	27
Chesapeake	4/	-	4/	29
South Atlantic	4/	8	4/	62
Gulf	4/	11	4/	106
Pacific	4/	11	4/	151
Great Lakes	4/	1	4/	14
Total	4/	34	4/	442

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.

2/There were 2 redocumented vessels in December 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 34 in 1965; 1 in 1964; 2 in 1963; and 19 prior to 1959.

3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.

4/Not available.

Source: Monthly Supplement of Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.



U. S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE, UNDER QUOTA:

United States imports of tuna canned in brine during January 1-February 26, 1966, amounted to 9,620,930 pounds (about 458,140 standard cases), according to preliminary data compiled by the U. S. Bureau of Customs. That was an increase of 130.4 percent from the 4,175,915 pounds (about 198,853 standard cases) imported during January 1-February 27, 1965.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1966 at the 12½-percent rate of duty has not been announced; however, in 1965 the quota was 66,059,400 pounds (or about 3,145,685 standard cases of 48 7-oz. cans). Any imports in excess of that quota were dutiable at 25 percent ad valorem, but total imports were below the quota in 1965.



The processed fresh fish and shellfish subgroup index dropped 0.8 percent from February to March 1966 mainly because of lower prices for fresh small haddock fillets at Boston (down 13.3 percent). Prices for other items in the subgroup were unchanged from the previous month. As compared with the same month a year earlier, the subgroup index this March was higher by 15.2 percent. Prices were considerably higher for South Atlantic fresh shrimp (up 10.5 percent) at New York City and for standard shucked oysters (up 23.5 percent) at Norfolk than in March 1965.

The March 1966 subgroup index for processed frozen fish and shellfish rose 5.9 percent from the previous month as a direct result of higher prices for frozen shrimp (up 11.2 percent) at Chicago. This was somewhat offset by lower prices for small haddock fillets at Boston which dropped 2.6 percent. The subgroup index this March was

12.4 percent higher than in the same month of 1965 chiefly because of substantially higher prices for frozen shrimp (up 18.5 percent) and frozen flounder fillets (up 12.0 percent).

The March 1966 subgroup index for canned fishery products rose 7.4 percent from the previous month. But prices for canned tuna were 17.6 percent higher because of the much stronger market due to light supplies and those for canned California jack mackerel were up 6.9 percent. Prices for canned pink salmon and Maine sardines were unchanged from February to March. As compared with the same month a year earlier, the index this March was 27.9 percent higher. Prices were sharply higher for canned pink salmon (up 39.1 percent) as a result of the very light 1965 pack and canned tuna (up 29.7 percent) than in March 1965. (U. S. Department of the Interior, Bureau of Commercial Fisheries, Market News Service.)

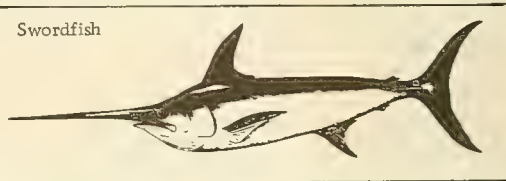


NEW FISHERIES IN MIDDLE ATLANTIC REGION

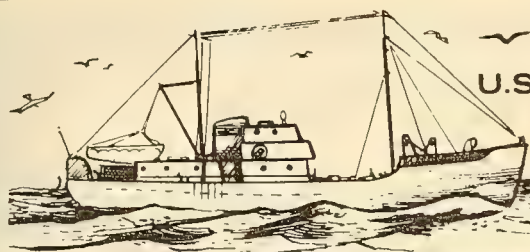
Important developments in the Middle Atlantic region include a decrease in two valuable commercial and sport fisheries--croaker and sea trout--and the growing importance of two new fisheries--tuna and swordfish. From nearly 58.5 million pounds of croaker (hardhead) taken in 1945, the commercial landings have fallen in recent years to less than 3 million pounds. The fishery for sea trout or weakfish has tumbled from 36.5 million pounds taken commercially in 1945 to 2 million pounds or less in recent years. The croaker decline is attributed by some to a series of cold winters with low water temperatures that the young fish cannot tolerate.

Nearly 6 million pounds of tuna (largely bluefin) were taken in the Atlantic ocean by U.S. fishermen and landed in Middle Atlantic Coast ports in 1964 as compared with 40,000 pounds just 2 years earlier. The region's growing tuna fishery is drawing purse seiners from as far away as the Pacific coast.

The fishery for swordfish (taken traditionally by harpoon) has increased markedly in the Middle Atlantic region in recent years as the fishery from New England waters expanded southward especially in the winter and spring and as the long-line fishing method was adopted.



--Conservation Note 17, *The Big Bite*,
Bureau of Commercial Fisheries,
U. S. Department of the Interior,
Washington, D. C. 20240



U.S. DEPARTMENT OF THE INTERIOR
FISH & WILDLIFE SERVICE
BUREAU OF COMMERCIAL FISHERIES

FISHING VESSEL SAFETY BULLETIN

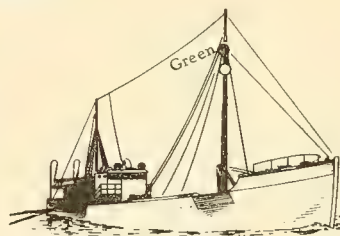
REVISED FISHING VESSEL RULES OF THE ROAD - EFFECTIVE 1 SEPTEMBER 1965

Important Changes in International Rules of the Road for Fishing Vessels:

LIGHTS DAY SHAPES SOUND SIGNALS

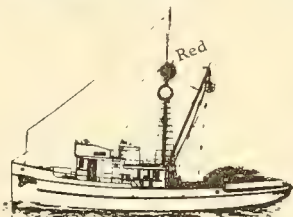
LIGHTS FOR VESSELS ENGAGED IN FISHING BY TRAWLING
(DRAGGING DREDGE-NET OR OTHER GEAR THROUGH THE WATER)

GREEN over WHITE - OTTER TRAWLERS SCALLOP DREDGERS
CLAM DREDGERS
OYSTER DREDGERS
BEAM TRAWLERS



LIGHTS FOR VESSELS ENGAGED IN FISHING WITH LINES OR NETS
EXCEPT TROLLING LINES
(Trollers should show only regular navigational lights.)

RED over WHITE - SEINERS GILL-NETTERS
LINE TRAWLERS LONG-LINERS
HAND LINERS HARPOONERS



Lights all around (32 points). Visible at least 2 miles.
Vertical distance between lights not less than 4 or more than 12 feet.

DAY SHAPES FOR ALL VESSELS ENGAGED IN FISHING



Black shape consisting of two cones each not less than 2 feet in diameter with their points together one above the other, displayed where best can be seen. Visible at a minimum distance of 2 miles. Vessels less than 65 feet in length may substitute a basket for this shape.

SOUND SIGNALS IN FOG AND CONDITIONS OF RESTRICTED VISIBILITY

4-6 seconds 1 sec. 1 sec.



Vessels engaged in fishing when under way or anchored shall sound at intervals of not more than one minute, three blasts in succession, namely, one prolonged blast followed by two short blasts.

U. S. Coast Guard publication CG-169 contains the complete International Rules.

Note: See Commercial Fisheries Review, May 1965 p. 42.



International

FISH MEAL

MANUFACTURERS MEET IN CAPE TOWN, SOUTH AFRICA:

The Sixth Annual Conference of the International Association of Fish Meal Manufacturers was held in Cape Town, South Africa, April 25-29, 1966. Approximately 100 manufacturers of fish meal and fishery industry scientists from nearly 20 countries were expected to attend. Also expected at the Conference were a number of agents, brokers, and importers in the fish meal trade.

The Conference was postponed from its usual October dates in order that delegates might see the large and modern South and South-West African fish meal industries in full operation.

The private Association, which was formed in 1959, has members from 16 countries as follows: Belgium, Canada, Chile, Denmark, France, Germany, Holland, Iceland, Morocco, Norway, Peru, Portugal, South Africa, Sweden, United Kingdom, and the United States. It was anticipated that all countries would be represented. The U. S. Fisheries Attache for western Africa was also expected to attend. Representatives of the Fishmeal Exporters Organization (FEO), with which the Association cooperates closely on promotional and similar matters, were to be present, and observers from the fish meal industries of Japan, Mexico, Spain, and New Zealand were invited to participate.

Since 1960, the Association has worked in close cooperation with the Food and Agriculture Organization of the United Nations (FAO), which will again be represented at the Conference. Over the years the Association and FAO have continued to explore ways and means of developing fish flour (fish protein concentrate) for human consumption. An Association representative recently took part in an

FAO Industry Steering Committee meeting set up by the Director General of FAO, to provide greater cooperation between industry and FAO in the Freedom from Hunger Campaign. Fish meal manufacturers internationally are becoming increasingly conscious of the important part they may play in combating malnutrition, not only in the development of fish protein concentrate, but because fish meal is an important ingredient in feeding poultry and pigs which are rapidly increasing in numbers in both developed and underdeveloped countries.

The Association's Executive Council and Scientific Committee endeavors to ensure orderly marketing of a product which is manufactured to uniformly high standards, and the exchange of much technical information. It is stressed that this is the primary objective of the Association, which is not concerned with matters of price or actual marketing. The Association has met in 14 different countries in the past 6 years. (International Association of Fish Meal Manufacturers, March 1966.)

NORTHWEST PACIFIC FISHERIES COMMISSION

JAPANESE INDUSTRY SEEKS EXTENSION OF CONVENTION

The Northwest Pacific Fisheries Commission (Japan-U.S.S.R.) held its tenth annual meeting in the Soviet Union in March 1966. In anticipation that the Commission might discuss the revision of the existing fisheries convention, which expires at the end of 1966, the Japan Fisheries Society in February held a special meeting to develop industry's position. The industry leaders shared the unanimous view that some changes in detail in the present treaty are desirable, but the treaty has performed a valuable role in protecting the resources and in maintaining an effective and orderly utilization of those resources. As such, Japan should not at this time press for changes in detail but should seek an extension of the present treaty. The Fisheries

International (Contd.):

Agency is reported to hold a similar view. (Suisan Tsushin, February 11, 1966.)

* * * * *

JAPAN AND U.S.S.R. DIFFER ON STATUS OF KING CRAB RESOURCE IN NORTHWEST PACIFIC:

A sharp disparity in views on crab resource conditions marked discussions held between Japanese and Soviet fishery negotiators in Moscow.

The discussions began March 1 to fix a Northwest Pacific fishery agreement for 1966 under the Northwest Pacific Fisheries Commission. Two subcommittees were established: one for scientific and technical matters and the other for finances.

Soviet members of the scientific and technical subcommittees claimed that both Japan and the U.S.S.R. caught too many crabs in 1965, causing the size to diminish this year. They also said that crab resources as a whole have declined.

Japanese negotiators, on the other hand, termed the Soviet claim as unfounded and unacceptable. They pointed out that while Japan limited its crab fishing fleets last year to 4, the same as for 1964, the Soviet side increased its fleets from 6 to 7 and had a total catch amounting to 420,000 cases (48 $\frac{1}{2}$ -lb. cans) against the previous year's figure of 378,000.

Japanese catches last year totaled 240,000 cases as compared with the preceding year's 252,000 cases, they said.

The subcommittee was scheduled to take up the matter again.

The subcommittee completed discussions on herring resources. As soon as agreement was reached on crab resource conditions, it was to begin discussions on salmon resources. (Japan Times, March 8, 1966.)

Note: See Commercial Fisheries Review, April 1966 p. 53.

FOOD AND AGRICULTURE ORGANIZATION

FISHERY DATA CENTER ESTABLISHED:

A Fishery Data Center is being established by the Food and Agriculture Organization (FAO) in accordance with a resolution of the

Intergovernmental Oceanographic Commission. Initially, the new Center will serve as a clearinghouse for data coming from the International Indian Ocean Expedition. Other international projects may be covered in the future. As planned, the Fishery Data Center would be a responsibility of the Fish Stock Evaluation Branch within the Fisheries Resources and Exploitation Division of FAO's Fisheries Department.

INTERNATIONAL WHALING COMMISSION

NORTH PACIFIC MEMBER NATIONS REVIEW AREA SITUATION:

Commissioners and advisers from the North Pacific Member Nations (Canada, Japan, U.S.S.R., and United States) of the International Whaling Commission met in Honolulu, Hawaii, February 14-17, 1966, to (1) discuss the possible threat of overfishing to the whale stocks in the North Pacific area and (2) to consider whaling regulations.



Fig. 1 - Japanese whale catcher in North Pacific.

The North Pacific Working Group of scientists met during the preceding week to review all available data on the condition of North Pacific whale stocks and to discuss stock assessments. The report of the Working Group was received by the Commissioners at their opening session and this report was used as the principal basis for their discussions. Careful consideration was also given to the proposals presented by each delegation.



Fig. 2 - Japanese whaling factoryship operating in North Pacific.

International (Contd.):



Fig. 3 - Flensing sperm whale aboard a Japanese factoryship in North Pacific.

It was found that there were large areas of agreement but the differences which remained prevented the adoption of any recommendations to the International Whaling Commission.

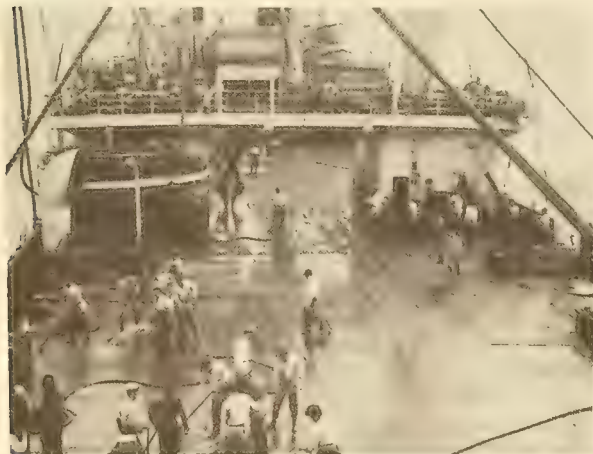


Fig. 4 - Washing the deck of a Japanese whaling factoryship.

It was agreed that additional stock assessments should be completed by the scientists as soon as possible and that a meeting of the Commissioners of the North Pacific Member Nations should be held the week prior to the 18th Annual Meeting of the International Whaling Commission to give further consideration to North Pacific whaling problems.



Argentina

FROZEN FISH INDUSTRY:

Argentina's frozen fish production consists primarily of fish fillet blocks with a small percentage of frozen whole fish. Annual production for the years 1962-64 was:

Year	Quantity
	<u>Metric Tons</u>
1964	7,888
1963	6,101
1962	1,933

There are four firms engaged in the fish block industry which utilizes mainly hake ("merluza"), otherwise called "Argentine whiting." In 1964, 3,473 tons of frozen fish were exported, of which 2,203 tons went to the United States. During 1965, one firm exported 1,501 tons of frozen fish blocks valued at \$359,000, of which 1,245 tons, valued at \$293,000, went to the United States. That same firm is planning to increase its fish production capabilities from 300 tons a month to 1,000 tons a month by June 1966. (U. S. Embassy, Buenos Aires, Argentina, January 26, 1966.)

* * * * *

CRAB FISHING POTENTIAL:

Atlantic waters off the southern tip of Argentina are rich in fishery resources, one of which is the "Centolla" crab. This prized species is said to be as large as king crab.

Argentina hopes to develop a crab fishery modeled after the U. S. king crab fishery in Alaska. The Buenos Aires office of the Argentine National Territory of Tierra del Fuego is collecting information on this subject including: (1) the names of shipyards which build and outfit vessels for the Alaska king crab fishery, and (2) the names of companies which supply processing equipment for the king crab industry.

Development of the Argentine crab fishery could lead to sales and investment opportunities for U. S. firms. Tierra del Fuego is a Free Trade Zone, and machinery entering for use there is exempt from Argentine customs duties. Furthermore, most equipment recently entering Argentina for use in the development of the fishing industry has also been exempted from customs duties. (United States Embassy, Buenos Aires, February 19, 1966.)



Bulgaria

FISHERY TRENDS:

Bulgaria intends to fish the North Pacific, reports J. Nichol of the Vancouver (Canada) United Fishermen's Union. He spent 4 days in Bulgaria as a tourist in October 1966 and had a chance to meet "officers of the (Bulgarian) fishermen's trade union." The center of the Bulgarian fishing industry is at Burgas on the Black Sea. At present, Bulgaria has only 3 deep-sea stern trawlers (supplied by the U.S.S.R.), but by 1970 a fleet of 20 trawlers and 2 refrigerated fish carriers will be acquired (also from the U.S.S.R.). Nichol also learned that Bulgaria declared a 12-mile territorial limit off her Black Sea coast. (Fisherman, January 21, 1966.)

Note: See Commercial Fisheries Review, August 1965 p. 67; April 1964 p. 51.



Burma

U.S.S.R. ENDS JOINT FISHERY RESEARCH WITH BURMA:

The research vessel Akademik Knipovich, with a party of Soviet and Burmese scientists aboard, returned to the port of Rangoon after a ten-day cruise in the Andaman Sea and the Bay of Bengal. Joint research was conducted on the high seas (to determine the potential resources for high-seas fishing) and in Burma's coastal waters (where sea bottom life was studied). Soviets will inform the Burmese Government on the results of their research in the Indian Ocean.



Canada

PER CAPITA CONSUMPTION OF FISHERY PRODUCTS INCREASES IN 1964:

Canadian per capita consumption of fishery products increased from a total of 14.5 pounds (edible weight in 1963) to 14.9 pounds in 1964. Most of the gain was in fresh and frozen fishery products with consumption up from 9.4 pounds in 1963 to 9.8 pounds in 1964, and cured fishery products increased from 1.7 pounds to 1.8 pounds. But consumption of canned fishery products dropped from 3.4 pounds (net weight) in 1963 to 3.3 pounds in 1964.

Although consumption of fishery products increased, Canada reported even larger increases in 1964 per capita consumption of poultry (up 6.2 percent) and meat (up 4.0 percent). (Dominion Bureau of Statistics, Ottawa, Canada, January 1966.)

* * * * *

ATLANTIC HERRING FISHERY CONFERENCE PLANNED:

An Atlantic Herring Fishery Conference was scheduled May 5-7, 1966, in Fredericton, New Brunswick, by the Canadian Federal-Provincial Atlantic Fisheries Committee.

A new awareness by the fishing industry of the potential of Canada's Atlantic herring resource, coupled with a rapidly expanding market for herring meal, herring oil, and herring as food for human consumption, are the main reasons for this initiative.

A number of papers were prepared for the Conference by scientists and technologists, Provincial and Federal fisheries authorities, fishing companies, and fishing vessel operators. The subjects included the herring resources of the Northwest Atlantic, current Canadian developments in the herring industry in the Atlantic coast Provinces, herring catching vessels and fishing gear, trends in the utilization of the species, and marketing and economic considerations. (Canadian Department of Fisheries, February 23, 1966.)

* * * * *

NEW BRUNSWICK FISHERIES DEVELOPMENT PROJECTS FOR 1966:

A number of joint projects for further development of the New Brunswick fisheries in 1966 were announced on February 3, 1966, by the Federal Fisheries Minister and the Minister of Fisheries for that Province. Among the more important of these are projects for crab and shrimp fishing, herring exploration in the Gulf of St. Lawrence, and the development of a combination fishing vessel. The Fisheries Research Board of Canada and the fishing industry will participate in parts of the program.

Apparently there are good prospects for crab and shrimp fishing, and this year's work, to be carried out by chartered vessels, will determine the feasibility of the commercial exploitation of the stocks, attempt to develop processing techniques, provide instructors for processing, and evaluate the market.

Canada (Contd.):

The herring project is to demonstrate the feasibility of catching herring in the Gulf of St. Lawrence with the object of establishing a fish meal industry based on that species. An 80-foot purse-seiner will be used to fish in various parts of the Gulf, and arrangements will be made with existing plants to produce fish meal.

New types of gear and equipment to increase the efficiency of the dragger fleet will be introduced. This project calls for the conversion of a stern trawler for combination operations. Last year's demonstrations of the "Atlantic Western Trawl" developed by the Federal Department of Fisheries will be continued. The application of Scottish seine-netting techniques will be demonstrated on existing groundfish draggers.

Other Federal-provincial projects in New Brunswick will involve the development of a light-attraction system for sardines, with a view to increasing the production of weirs; the design and construction of an improved establishment for curing herring as "bloaters"; the demonstration of proper harvesting techniques and drying and packaging methods for Irish moss; improved methods of catching, processing, and packaging silver eel for European markets; and the introduction of new techniques to increase the catch of smelt. As in the past, technical assistance for all projects will be made available by the Industrial Development Service of the Federal Department of Fisheries. (Canada's Department of Fisheries, Ottawa, February 3, 1966.)

* * * * *

NEW FISHERIES PATROL VESSEL FOR NOVA SCOTIA AREA:

A contract for the construction of a new Federal Department of Fisheries patrol vessel for the Canadian Maritimes Area has been awarded to a shipbuilding firm in Meteghan, Nova Scotia, the Federal Fisheries Minister announced February 25, 1966. The contract is for \$134,248. The new 70-foot wooden patrol vessel is for the Department's Conservation and Protection Service and will replace the Limanda. The new vessel will be equipped with a 346-horsepower marine engine. She will be stationed at Digby, Nova Scotia, and will carry out patrol duties on the Nova Scotia side of the Bay of Fundy and the counties of Digby, Yarmouth, and Shelburne.

* * * * *

FISHERIES TRADE MISSION TO AUSTRALIA AND NEW ZEALAND:

A Canadian fisheries trade mission left Vancouver, Feb. 23, 1966, for Australia and New Zealand. Recent Australian interest in buying frozen groundfish from Canada probably stimulated the mission. Australia and New Zealand are traditional customers for Canadian canned salmon and canned sardines. The 7-man mission includes representatives of the fisheries trade in Nova Scotia, New Brunswick, and British Columbia, as well as Government officials. (Canadian Department of Trade and Commerce, Ottawa, February 16, 1966.)

* * * * *

NEWFOUNDLAND WHALING POTENTIAL TO BE SURVEYED BY JAPANESE VESSEL:

A Japanese whaling firm hopes to establish a whaling base in Newfoundland. The firm is reported to have reached an agreement with Canadian interests whereby it will operate a whaling vessel off Newfoundland to survey the possibilities, beginning in May 1966. The vessel, crewed by Japanese, will be chartered to Canada. Pending the outcome of the survey, a decision will be made on establishing a joint whaling operation in Newfoundland. It is reported that this arrangement was requested by Canada. The Japanese firm plans to employ the 754-ton Kyo Maru for the survey. (Nihon Suisan Shimbum, January 21, 1966.)



Canary Islands

FISHERY ACTIVITIES:

While the Canary Islands include a total of seven islands, which together comprise two provinces of Spain (Tenerife and Gran Canaria), principal fishery activities are concentrated in three. Las Palmas, on the Island of Gran Canaria, is by far the most important fishing center, out of which operate some 145 vessels of all kinds. Next in importance is the port of Arrecife, on the Island of Lanzarote. Although there are some 191 fishing vessels operating out of that port, 182 are "pontones" (unpowered small boats), and their total production is not large. The third port is Santa Cruz, on the Island of Tenerife, at which 61 vessels are based, 52 of which are "pontones."

According to statistics issued by Sindicato Provincial de la Pesca de Las Palmas

Canary Islands (Contd.):

for the year 1963, the latest year available, landings at the three ports totalled 127,255 metric tons of all species. Exports of fishery products in all forms (fresh, frozen, dried,

3 each at Arrecife and Santa Cruz), all of whose production of about 18,000 metric tons annually goes to Spain; and 35 plants (26 at Las Palmas, 5 at Arrecife, 4 at Santa Cruz) producing salted and dried fish for export to Spain and several West African Countries.



salted, canned, etc.) were 47,388 metric tons. Of that total, 28,636 tons went to mainland Spain, 6,167 tons to Italy (almost all frozen), 2,647 tons to Spanish Guinea (all dried), 2,213 tons to Congo-Brazzaville (almost all dried), 1,403 tons to Ghana (almost all dried), and the rest to 10 other African, European, and South American countries.

With regard to freezing and cold-storage facilities, there are 3 in Las Palmas, and 1 each at Arrecife and Santa Cruz. Storage capacity of the Las Palmas freezers is 8,000 tons in a rather old plant, 6,000 tons in a new plant recently opened, and 5,000 tons in a plant not quite completed but to be opened shortly. As a result of this marked increase in cold-storage space, storage rates have recently dropped from US\$10 a ton to \$5.50 a ton, an obvious benefit to the fishing industry.

Canneries for fish included until recently 8 in Las Palmas, 3 in Arrecife, and 3 in Santa Cruz. It is reported, however, that one of the Las Palmas canneries recently was closed and demolished to make room for a new hotel (an indication of the booming hotel business in Las Palmas and perhaps also an indication of the declining state of the tuna-canning industry in the Canary Islands). Although most of the canned tuna production goes to mainland Spain, some is also exported to Italy.

Other processing activities include a total of 16 fish meal plants (10 at Las Palmas and

Las Palmas has become an important base for the operation of Spanish and Japanese fishing vessels, but very rarely do other foreign vessels use this port. When they do, it is almost entirely for fuel or service. Although it was reported in January 1964 that Poland was planning the establishment of an operating base for fishing vessels in Las Palmas, those plans apparently did not materialize. There are at the present time estimated to be about 50 Japanese trawlers and 100 Japanese tuna vessels operating out of Las Palmas. The vessels are all refrigerated and will call at various West African ports for discharge of fish, but are based primarily at Las Palmas. Eight Japanese fishing companies maintain offices and resident representatives at Las Palmas. In addition to the trawlers and long-liners, a number of Japanese carrier vessels, with carrying capacities of up to 1,500 tons each, call at Las Palmas for transport of frozen tuna and trawl fish to Japan, Puerto Rico, and Mediterranean countries. According to one Japanese resident representative, Las Palmas is a good operating base because (1) labor is cheap, (2) transshipping can be accomplished without payment of customs or import taxes, (3) the climate is good year-round, and (4) recreation facilities for crews are good.

Note: See Commercial Fisheries Review, April 1964 p. 71.



Cuba

FISH MEAL IMPORTED FROM MOROCCO:

Morocco will export 4,000 metric tons of fish meal to Cuba in 1966. Those exports were included in a trade agreement signed between Morocco and Cuba in February 1965. In the past Morocco also exported to Cuba large amounts of canned sardines and small quantities of canned mackerel and canned tuna. (United States Embassy, Rabat, February 4, 1966.)



Denmark

POND TROUT MARKET TRENDS IN 1965 AND OUTLOOK FOR 1966:

During early 1966, the surplus supply of Danish trout and low prices which characterized most of 1965 gave way to a tight supply and rising prices. During February 1966, the price on all sizes of Danish trout rose about 9.9 U. S. cents a pound.

The available supply of Danish trout in February 1966 was not sufficient to meet export demands. This development was attributed to heavier than usual sales during the fall and severe winter weather which limited production.

During the last 4 months of 1965, Danish monthly pond trout sales were from about 800 to 900 metric tons, compared with about 600 to 700 tons in the same months of 1964.

The Danish supply of trout is expected to be somewhat less in 1966 than in 1965 when production reached a record of nearly 11,000 metric tons. The 1966 goals were probably set lower as a result of the surplus during most of 1965. Exports last year were a record 10,742 metric tons valued at US\$10,143,000. Although the quantity exported in 1966 may not be as high, it seems most likely that the value of trout exports will set a new record.

Prices for Danish trout were not expected to drop even with the arrival of warm weather in the spring of 1966. The Lenten season was expected to exert an upward influence on prices. The minimum prices set on exports of certain trout products by the Danish Ministry of Fisheries on January 6, 1966, have in no way been responsible for the rising prices, according to reports from the trade.

The United States is a good market for Danish frozen trout taking 699 tons valued at \$596,700 in 1965.



Weighing pond trout in a Danish plant. In Denmark there are more than 500 trout ponds.

The premiere of a film on the Danish pond trout industry was recently held in Esbjerg. The film will be used in promoting sales abroad and is available with English, German, French, and Italian commentary.^{1/} (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, February 23, 1966.)

^{1/}Requests for information about the film should be addressed to Erling Hulgaard, Fisheries Attache, Consulate General of Denmark, 280 Park Avenue, New York, N. Y. 10017.

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EXPERIMENTAL PRODUCTION OF ODORLESS, TASTELESS, EDIBLE FISH MEAL:

A Danish chemical engineer reports he has developed a process to produce odorless and tasteless fish meal by treating herring with an irradiation and enzymatic process. Apparently the product could be used for human food. A Danish patent apparently has been applied for. Research was financed by the inventor and West German capital. Ger-

Denmark (Contd.):

man and Norwegian fishery industries are interested in the process. A consortium has been formed in West Germany to finance development and use of the product.

The Technological Research Laboratory of the Danish Fisheries Ministry is unfamiliar with the new process and views the development with some reserve. (U. S. Embassy, Copenhagen, January 25, 1966.)



Ecuador

JAPANESE TUNA ENTERPRISE FAILS TO MATERIALIZE:

A Japanese firm planned to establish a joint tuna-fishing enterprise in Ecuador, to be located at Guayaquil. This information was based on an article in the Japanese periodical Suisan Keizai Shimbun of November 25, 1965. It has since been reported that this enterprise failed to materialize.

Note: See Commercial Fisheries Review, February 1966 p. 57.



Gabon

ATLANTIC TUNA FISHERIES:

Tuna are found in the waters off Gabon in an area extending from the Equator south to Pointe Noire in the Congo (Brazzaville), extending up to 250 nautical miles from the coast. The species found are characteristic of those in the Gulf of Guinea: yellowfin tuna (Thunnus albacares), big-eyed tuna (Thunnus obesus), and skipjack (Katsuwonus pelamis). In addition to yellowfin and big-eyed tuna, Japanese fishermen with long-line gear have taken albacore (Thunnus alalunga) off Gabon.

There are no Atlantic tuna fisheries in Gabon, and the fishing industry in Gabon exploits to practically no extent the enormous resources of surface fish such as sardines and tuna. However, tuna are found off the coasts of Gabon.

Yellowfin tuna have been found in the southern part of the Gulf of Guinea off the coast of Gabon and also off the Islands of Annobon and São Tome. Fishing grounds are located from 2 to 10 nautical miles from the coasts of the

islands and also in the area between them. The best season seems to be from November to March with the best periods being in November and February. It is estimated that it would take at least a year of trial fishing to gain information extensive enough to be of value to prospective fisheries.



The principal fishing firm located in Gabon has two trawlers which are not designed for tuna fishing. At present this firm is not known to have any plans to acquire tuna vessels. A French firm has indicated some interest in locating in Gabon, but does not intend to do so until the fishing possibilities off the coasts of Gabon have been more thoroughly explored.

There are no shore-based facilities available for handling tuna in Gabon. The nearest tuna facilities are in Pointe Noire, Congo. There are no plans to construct such facilities in Gabon at present.

No biological or technical research is presently being conducted by government installations on tunas. (United States Embassy, Libreville, February 21, 1966.)



East Germany

FISHERY RESEARCH IN THE NORTHWEST ATLANTIC:

East Germany's fishery research vessel Ernst Haeckel conducted a research cruise in the Northwest Atlantic in early 1966. Though its exact area of operations was not known, it may be assumed that the vessel made its studies in the Labrador Sea where about 20 East German fishing and fish-processing vessels operated in early February 1966. The cruise ended in mid-March 1966.

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SMALL STERN TRAWLERS SOLD TO DANISH FIRMS:

Two Danish fish-exporting firms early this year contracted with an East German shipyard at Rosslau for the delivery in 1968 of 20 to 25 steel fishing vessels (180 to 190 gross tons each) with a total value of from US\$3.6 million to US\$4.4 million. One of the Danish buyers had previously bought 3 trawlers from the East German yard and had 15 additional vessels on order when the new contract was concluded. (United States Embassy, Copenhagen, March 2, 1966.)

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SALE OF FISHING VESSELS TO SWEDEN:

The East German shipyard at Rosslau on the Elbe River has contracted to deliver 8 small fishing vessels to Swedish firms during 1966, according to the Swedish press. This is the same East German shipbuilder that contracted to deliver 20 to 25 small stern trawlers to Danish firms. Since 1964, the Rosslau shipyards have sold 29 small fishing vessels to Denmark, Sweden, and Tunisia.



Ghana

SOVIET FISHERY AID:

Soviet aid to Ghana's fisheries has been severely affected by the ouster of 130 Soviet technicians on March 1, 1966. The remaining 800-900 U.S.S.R. technicians (among them over 300 fishery technicians) were asked by the new Ghanaian Government to leave by March 5, 1966. At that time, the Soviet Union was actively engaged in the following fishery projects: (1) construction of fish cannery, fish-smoking plant, fish-meal plant, can-mak-

ing plant (all at Tema, Ghana); (2) delivery of medium and large trawlers; (3) training of Ghanaian fishermen in the Soviet Union (over 120 as of August 1964) and aboard Ghana's fishing fleet; and (4) construction of fishing ports at Tema, and other cities. Other East European countries (Poland, Yugoslavia) also had extensive fishery aids and/or trade dealings with Ghana. It seems, however, that those countries will not be affected by the change in Ghana's Government. (New York Times.)



Greece

SOVIETS DELIVER STERN TRAWLERS TO GREECE:

Greece has ordered five large stern trawlers from the Soviet Union. The first of the five vessels was delivered in December 1965. The balance will be delivered during June-December 1966. The Greeks also have ordered three refrigerated transport vessels from Soviet shipyards. (Alieia, December 1965.)



Hong Kong

RECENT FISHERY TRENDS:

Fishery Trade: During 1965, the value of Hong Kong's imports of fish and fishery products amounted to HK\$177 million (US\$30.8 million) while the value of fishery exports reached only HK\$74 million (US\$12.9 million). Of the exports, HK\$29 million (US\$5 million) consisted of re-exports indicating a thriving local fish-processing industry.

Hong Kong Fish Sold on Domestic Markets, 1965	
Type	Quantity
	Metric Tons
<u>Fresh Marine Fish:</u>	
Golden thread	9,671.6
Gareupa	813.6
Lizardfish	2,693.1
Red sea bream	516.6
Croaker	1,735.0
Yellow croaker	437.2
Mackerel scad	1,342.6
Anchovies	223.3
Others	33,489.7
Total Fresh	50,922.7
<u>Salted and Dried Marine Fish:</u>	
Anchovies	266.8
Croaker	296.8
Others	1,358.0
Total Salted	1,921.6
Grand Total	52,844.3

Hong Kong (Contd.):

Domestic Markets: In 1965, over 50,000 metric tons of fresh marine fish were marketed throughout the Crown Colony, about one-fifth consisting of the species golden thread (see table). Salted and dried products were not much in demand; less than 2,000 tons were sold.

Aid to Industry: At the end of 1965, about HK\$1.7 million (\$290,000) was advanced to Hong Kong's fishermen and fish-processing firms. (Special Supplement No. 4 to the Hong Kong Government Gazette, January 28, 1966.)



Hungary

FISH MEAL FROM PAKISTAN:

The Governments of Pakistan and of the Hungarian People's Republic concluded a trade agreement on February 8, 1966. Fish meal is listed among the Pakistani commodities to be exported to Hungary, but the quantities are not specified. (United States Embassy, Karachi, March 11, 1966.)



Iceland

EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, DECEMBER 31, 1965:

Icelandic Export Stocks ^{1/} of Principal Fishery Products, December 31, 1965			
Item	Quantity	Value	
	Metric Tons	Million Kr.	US\$1,000
Groundfish, frozen:			
for export to:			
United States	1,621	42.1	977.7
Other countries	2,979	49.5	1,149.5
Stockfish	1,500	49.5	1,149.5
Herring, frozen	9,304	58.6	1,360.9
Industrial products:			
Fish meal:			
Herring	37,080	311.5	7,234.1
Other fish	1,349	10.4	241.5
Herring oil	46,856	379.5	8,813.3

^{1/}Includes only stocks intended for export.
Note: Icelandic kronur 43.06 equal US\$1.00.

As of December 31, 1965, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 1,621 metric tons, a gain of 611 tons from the stocks on hand November 30, 1965. (United States Embassy, Reykjavik, January 27, 1966.)



India

TO BUY FISHING VESSELS ABROAD:

In a speech to the fifth meeting of the Central Board of Fisheries at Bombay, the Indian Minister for Food and Agriculture reported that negotiations would begin with the U.S.S.R. and Japan for the importation of 10 or 15 fishing vessels and for the construction of facilities to process the catches. The Minister emphasized the possible expansion of India's fishing industry by pointing out that annual Indian fishery production is about 1.5 million metric tons against a potential of 10 million tons.

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EXPORTS OF FISHERY PRODUCTS INCREASING:

Freezing and canning fishery products is a relatively new industry in India. From the beginning, the industry has been export oriented, according to a new publication, the Seafood Trade Journal, first issued in January 1966 by the Seafood Cannery and Freezers' Association of India (Cochin). The first commercial shipment of frozen shrimp from India was made to the United States in 1953. By 1959, there were 7 Indian firms processing and exporting frozen or canned fishery products. The Association reports that there are now at least 14 freezing plants and 11 canning plants in India producing fishery products such as frozen and canned shrimp, frozen frog legs, and frozen lobster tails. India has become one of the leading suppliers of shrimp to the United States. India's total exports of frozen shrimp to all countries in-

India's Exports of Major Fishery Products, 1962-1965

Product	1965		1964		1963		1962	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
	Metric Tons	US\$ 1,000	Metric Tons	US\$ 1,000	Metric Tons	US\$ 1,000	Metric Tons	US\$ 1,000
Shrimp, frozen	7,028	8,742	5,870	6,652	3,967	4,475	2,238	2,284
Shrimp, canned	1,148	2,006	1,074	1,476	1,231	1,599	970	1,384
Lobster tails, frozen	111	269	41	78	53	66	40	48
Frog legs, frozen	443	568	332	348	514	674	391	485

India (Contd.):

creased from 5,870 metric tons in 1964 to 7,028 tons in 1965.



Ivory Coast

FISHERY LANDINGS, 1965:

The Ivory Coast fishing industry continued its upward trend in 1965, according to statistics released by the Fisheries Service. The Abidjan-based fleet of some 70 vessels (35 trawlers and 35 purse seiners) landed a total of 44,599 metric tons of fish and shellfish during 1965. This was 14.6 percent more than the 38,116 tons landed in 1964, almost exactly equal to the 14.2 percent annual increase projected in the GOIC's (Government of the Ivory Coast) economic development plans for this industry. It should be noted, however, that these plans call for an annual increase of only 6.8 percent for the next five-year period.

Among the 50-odd species landed at Abidjan, eight accounted for more than 1,000 tons each (see table).

Leading Species Landed at Abidjan, 1965		
Common Name	Scientific Name	Quantity
		Metric Tons
Sardine	<i>Sardinella aurita</i>	4,318
Herring	<i>Sardinella eba</i>	13,113
Grun	<i>Brachydeuteros auritus</i>	8,806
Jacks	<i>Vomer, Chloroscrombrus</i> sp.	1,067
Tuna, bonito	<i>Euthynnus, Auxis, Sarda,</i>	
and skipjack	<i>Katsuwonus</i> sp.	1,989
Drum	<i>Pseudotolithus senegalensis</i>	2,930
Threadfin	<i>Galeoides decadectylus</i>	1,506
Soles	<i>Cynoglossus, Solea</i> sp.	1,090
Other	"	9,780
Total		44,599

Included were 145 tons of shrimp. Although production of shrimp for the first six months of the year exceeded that of the first half of 1964, total production for the year was somewhat less than the 160 tons caught in 1964. Aside from small quantities consumed locally, Ivory Coast shrimp is exported to France, some fresh by air and some cooked and frozen shipped by both air and sea.

Not included are tuna landings used by the small local cannery and for transshipment to Puerto Rico, Europe, and Japan. This industry continued its upward trend, accounting for 10,995 metric tons in 1965, plus an

additional estimated 8,000 tons transshipped directly from tuna vessels to a refrigerated carrier.

Continuing its comprehensive plans for fishing industry development, the GOIC expects to shortly commence actual construction of the second quay in the new fisheries port at Abidjan. It was also expected that the end of March would see the announcement of the award of contracts for the construction of the new 3,000-ton storage capacity freezer plant and the new 50-ton-a-day tuna cannery. Later plans, the time of which is yet uncertain, include a can-making plant, byproducts or fish meal plant, and a fish-distribution system into the interior using rail and refrigerated truck facilities to serve nine interior population centers. (Regional Fisheries Attache, United States Embassy, Abidjan, March 15, 1966.)



Japan

TUNA LANDINGS IN YAIZU, FEBRUARY 1966:

February 1966 fish landings at the Japanese port of Yaizu (the leading tuna port), as tabulated by the Yaizu Fishery Cooperative

Yaizu Fish Landings by Species, February 1966 with Comparisons			
Species	1966		1965
	Feb.	Jan.-Feb.	Feb.
	(Metric Tons)		
Tuna:			
Albacore	955	1,658	928
Skipjack	2,597	3,314	681
Other	5,978	11,655	6,081
Mackerel	4,410	4,632	446
Others	772	1,530	658
Total	14,712	22,789	8,794

Association, totaled 14,712 metric tons valued at 1,760 million yen (US\$4.9 million). This was close to a twofold increase over February 1965 landings, which totaled 8,794 tons valued at 430.3 million yen (\$1.2 million). The increase was primarily due to a tenfold increase in mackerel landings. (*Suisan Keizai Shimbum*, March 10, 1966.)

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TUNA FISHING TRENDS:

The Japanese Fisheries Agency reported in early March 1966 that in 1965 Japanese tuna long-liners operating within the proposed eastern Pacific yellowfin regulatory area

Japan (Contd.):

landed 21,610 metric tons of fish, of which 2,733 tons consisted of yellowfin tuna. In December 1965, 22 long-liners fished that area.

Good albacore tuna fishing had developed in February 1966 in the Atlantic Ocean off Recife, Brazil, in the area 30° W. longitude, 25°-30° S. latitude. Catches averaging 2.7-3 tons a day were being made by Japanese tuna long-liners which concentrated in large numbers in that area.

Good yellowfin fishing was reported in the Gulf of Guinea off West Africa in late February, with catches averaging 2.5-2.7 tons a day.

Prices of frozen tuna exported to the United States from Japan proper in early March 1966 were holding firm at US\$500 a short ton for round albacore and \$490-495 a short ton for dressed yellowfin, both prices f.o.b. Japan. Atlantic-caught yellowfin and albacore transshipped to the United States were bringing \$495-500 a short ton, f.o.b. Las Palmas. Japanese observers were of the opinion that the good albacore fishing off Brazil might serve to check any further albacore price increases.

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TUNA FISHING OFF AUSTRALIA:

Three units of a Japanese fishing long-line fleet fished for tuna south of Tasmania in late 1965. The vessels, ranging from 123 to 136 feet long, each carry a 50-mile long-line to which are attached 2,000 hooks. The line is buoyed every 100 feet and is set 30 to 60 feet below the surface. It takes about 18 hours to retrieve the line which is shot once a day. The catch rate is understood to have been between 2 and 3 fish per 100 hooks, the tuna averaging between 50 and 200 pounds, with exceptionally large ones up to 500 pounds. The Japanese fleet, consisting of between 10 and 15 long-liners, was the same fleet that fished off the east coast of Tasmania in 1964. (Australian Fisheries Newsletter, February 1966.)

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EXPANDS TUNA PURSE-SEINE
TEST FISHING OFF WEST AFRICA:

With the hope of establishing a new method of fishing tuna in the South Atlantic, experimental purse-seine fishing will be ex-

panded off the coast of West Africa by a Japanese fishing firm. The experimental fishing will be done by a fleet of 3 purse-seine vessels, 1 refrigerated mothership, and 2 transport ships. Fishing tests will begin in June 1966 off the coast of Sierra Leone and Ivory Coast.

Tuna fishing with purse seines has been conducted on a small scale off the Sanriku coast of Japan, and full-scale deep-sea fishing operations were started in November 1964 off the coast of West Africa with the approval of the Fisheries Agency. Compared with long-line fishing (which has been the primary Japanese tuna-fishing method), it is reported that purse-seining has advantages in that: (1) It is easy to use instruments such as fish finders and (2) it is a more positive and efficient fishing method because it is possible to encircle a school of fish in a short time and obtain a large fish catch at a single cast of the net. If the experimental fishing operation proves successful, it will result in a major change in tuna fishing methods.

In the first experimental fishing operations (one purse-seine vessel, one mothership, and two transport ships) conducted by the company, the year's catch was only 4,000 metric tons of tuna and bonito. This was small considering the size of the fleet and the company lost money. As a result of this experimental operation, however, it was found: (1) the purse-seine method is more mobile than the long-line fishing method, and it is possible to conduct fishing operations in waters with abundant resources and closer to the coast; (2) the fishing grounds off the coast of Sierra Leone and Ivory Coast have abundant resources, and moreover, as seaweed grows thickly in comparatively shallow water, purse seining is more practical; and (3) as the tidal currents are swifter than in Japanese waters, it is necessary to strengthen the nets.

By improving fishing gear and methods based on the experience from the first experiments, and by increasing catches with additional purse-seine vessels, the company believes the operation can be made profitable and has, therefore, decided to proceed with this second experimental operation. (Nihon Keizai, February 20, 1966.)

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Japan (Contd.):

POWER REEL TO SAVE LABOR ON TUNA VESSELS:

Since early in 1965, one of Japan's leading tuna-fishing companies has employed its vessel, the 99-ton long-liner Hatsuhi Maru, to test a power reel to save on labor. From January 25 through February 20, 1966, the vessel conducted a second series of tests of the reel on the Southern Pacific fishing grounds near Ponape Island (between the Caroline and Marshall Islands). The crew was reduced to 15 from the normal complement of 20. About 250 baskets of gear were used. This is about two-thirds the amount ordinarily used on a vessel of this size. The daily catch of big-eyed, yellowfin, and other species of tuna averaged around 2 to 3 metric tons, which is about the same as that taken by an ordinary vessel. Fishermen's organizations expressed concern that this would result in a drop in labor demand and reduce employment. The fishing department of the company reported, however, that the crew of the Hatsuhi Maru was pleased with the new method, especially since it did away with the arduous task of handling the lines. It was reported that the company plans to use the power reel on 2 of its 250-ton vessels, the Azuma Maru Nos. 15 and 26. Eventually the company was expected to convert its 30 or more tuna long-liners to the reel method of handling the gear. A number of other Japanese companies were reported also making the conversion. The president of one other company said that of their total of 13,500 gross tons of tuna vessels, the operations of about 3,500 tons of unprofitable vessels (especially those operating in the Atlantic) were to be ended and on the remainder such labor-saving devices as the power reel would be employed. (Suisan Tsushin, February 22, 1966.)

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LABOR-SAVING DEVICES BEING ADOPTED BY TUNA-FISHING FIRMS:

A Japanese fishing company, beginning in June 1965, embarked on a two-year plan to modernize its 16 tuna long-line vessels so as to reduce operating costs. To date, that firm is reported to have installed labor-saving equipment (consisting of a new method for setting and hauling long-line gear) on 3 vessels, ranging in size from 484-697 gross tons, and has succeeded in reducing manpower requirements from about 32-33 men to 25-26 men per vessel. The saving in labor

is estimated to total nearly one million yen (US\$2,778) a man, or equal to 5-6 million yen (\$13,889-16,667) per vessel.

Another major tuna-fishing company has dispatched the 300-ton tuna long-liner Einin Maru on a six-month fishing cruise to test the labor-saving devices installed on that vessel. In addition, that vessel will experiment with freezing fish by "hanging" instead of plate freezing, the usual method. Through mechanization of operations, the size of the crew on the Einin Maru is said to have been reduced by about 7 men to 20. If the fishing trials prove successful, the firm plans to gradually adopt the new methods on all its long-liners. (Shin Suisan Shimbun Sokuho, March 12, 1966.)

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TESTING VERTICAL LONG LINE:

For some time the Kanagawa Prefectural Fisheries Experimental Station, Misaki, has been studying the vertical long line for fishing tuna. The research vessel Sagami Maru, was conducting experiments in late February 1966 in waters nearby with 20 baskets of gear. In May, the amount of gear was to be increased to 30-50 baskets. Ultimately as many as 200 baskets will be used to test tuna fishing to depths of 100 to 150 fathoms. Also in May, another vessel, the Enoshima Maru, was to be equipped with the gear to conduct trials in the Sanriku area and to see if this fishing could serve as a possible supplement for the mackerel pole-and-line vessels of that district. (Suisan Tsushin, February 25, 1966.)

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FISHING COMPANIES SHOW DEFICIT IN TUNA OPERATIONS:

Financial statements released by some Japanese fishing firms for the business year 1965 indicate that a number of them lost money in their tuna operations despite a 50- to 60-percent increase in sales (due to the rise in tuna prices) as compared with 1964. Japan's leading fishing firm reportedly grossed 110 billion yen (US\$333 million) in total sales and netted a profit of over 7 billion yen (\$19.4 million), but lost 300-400 million yen (\$0.8-1.1 million) in its tuna operations. Another major company is reported to have lost over 500 million yen (\$1.4 million) from its tuna operations. Due primarily to this loss, that firm is said to be unable to pay any dividends

Japan (Cont.):

to its stockholders this year, although previously it had regularly declared a 6-percent dividend.

The Japanese firms reportedly anticipate a good year in 1966 in view of the growing worldwide demand for tuna and market conditions, and are planning on making substantial investments to reduce vessel operational costs through adoption of labor-saving devices. (Suisan Tsushin, March 7 & 11; Mina-to Shimbun, March 10, 1966.)

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FROZEN TUNA EXPORT MARKET
OUTLOOK IN 1966:

The Japan External Trade Promotion Organization (JETRO), in a report on the future of Japanese frozen tuna exports, stated that the outlook in 1966 is bright in view of the growing demand for tuna in the United States. The report stressed the importance of lowering production costs and selling better quality tuna at higher prices, rather than increasing production. To achieve this, the report points out the need to: (1) modernize production facilities; (2) develop positive measures to rationalize management; and (3) establish a thorough and orderly export system in line with export market trends.

According to that report, Japanese tuna production reached a peak in 1962 and thereafter began to trend downward, but albacore catches have been increasing annually. Frozen tuna validated for export in 1965 totaled 154,000 metric tons (4-percent increase over 1964), valued at US\$53,973,000 (1-percent decrease from 1964). Some noteworthy developments in 1965 were the general improvement in frozen tuna exports to Europe and Africa; the generally stagnant tuna market in the United States and Canada; increased catches of albacore and skipjack and the decline in the yellowfin catch; soft market conditions in the first half of 1965 and improvement observed in the latter half of that year.

The report added that the 3- to 4-percent increase in U. S. canned tuna demand in 1965 as against 1964 and the current canned tuna production situation in the United States provide a bright outlook for Japanese frozen tuna exports in 1966. However, it concluded that no significant increase in exports can be expected in view of the declining productivity

of the Japanese tuna fleet, reduced profits for vessel owners due to rising operating costs, and growing international competition. (Nihon Suisan Shimbun, March 9, 1966.)

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FROZEN TUNA EXPORTS TO U. S.
AND PUERTO RICO, DECEMBER 1965:

Japan's exports of frozen tuna to the United States and Puerto Rico increased in December 1965 as compared with the previous month. Exports to the United States proper almost

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, Nov.-Dec. 1965				
Species	1965			
	December		November	
	Qty.	Value	Qty.	Value
	Short Tons	US\$ 1,000	Short Tons	US\$ 1,000
Albacore:				
United States . . .	846	349	539	175
Puerto Rico . . .	1,525	515	1,096	351
Total	2,371	864	1,635	526
Yellowfin:				
United States . . .	877	325	290	94
Puerto Rico . . .	930	231	135	28
Total	1,807	556	425	122
Big-eyed:				
United States . . .	-	-	-	-
Puerto Rico . . .	102	25	-	-
Total	102	25	-	-
Skipjack:				
United States . . .	-	-	-	-
Puerto Rico . . .	1,181	173	1,127	156
Total	1,181	173	1,127	156
Other:				
United States . . .	-	-	-	-
Puerto Rico . . .	-	-	73	15
Total	-	-	73	15
Total United States	1,723	674	829	269
Total Puerto Rico	3,738	944	2,431	550
Grand total	5,461	1,618	3,260	819

Source: Japan's Bureau of Customs.

doubled in quantity while the value was 2½ times that in October. The increases in exports to Puerto Rico were proportionately not quite as large. (Fisheries Attache, United States Embassy, Tokyo, March 15, 1966.)

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SKIPJACK TUNA MARKET GOOD:

Japanese frozen tuna exporters are estimated to have contracted for export to the United States for about 2,500 short tons of skipjack tuna during the period early February-early March 1966. During that same

Japan (Contd.):

period, the f.o.b. export price for skipjack climbed from US\$290 a short ton to \$347.50, but subsequently declined to \$342.50 (said to be equal to about \$390 a ton, c.i.f.).

The ex-vessel price in Japan of frozen skipjack suitable for export ranged from 105-115 yen a kilogram (\$264-290 a short ton). Frozen tuna exporters were buying skipjack from such far-away points as Makurazaki, Kagoshima Prefecture (over 1,000 miles by rail from Shizuoka Prefecture). Skipjack fishing was good, with 300-400 metric tons being landed daily.

Beginning in late February, Japanese tuna packers were showing lively interest in canning skipjack in brine and in oil, paying 90-95 yen a kilogram (\$227-239 a short ton) for their supplies. The packers' interest in packing skipjack heightened following the establishment by the Tokyo Canned Tuna Sales Company on March 9 of a check-price of \$9.95 a case for lightmeat tuna in brine, an increase of one dollar a case over the previous price. (Suisan Tsushin, March 10, 1966.)

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EXPORTS OF CANNED TUNA,
JANUARY-OCTOBER 1965:

During October 1965, Japan exported 4,400 metric tons of canned tuna (in oil and brine) valued at US\$3.7 million. From January through October 1965, total exports of canned

Japan's Exports of Canned Tuna, January through October 1965, by Country of Destination (Quantity in Metric Tons--Value in \$1,000)							
Product	United States		Canada		All Other Countries		Total
	Oct.	Jan.-Oct.	Oct.	Jan.-Oct.	Oct.	Jan.-Oct.	
Albacore (in oil):							
Quantity	-	152.9	209.4	2,137.2	145.9	2,062.4	355.3
Value	-	149.5	192.0	1,917.6	123.7	1,703.1	315.7
Albacore (in brine):							
Quantity	1,354.6	12,066.0	-	50.4	-	-	1,354.6
Value	1,321.4	11,615.9	-	47.1	-	-	1,321.4
Albacore (in jelly or tomato paste):							
Quantity	-	-	3.3	28.8	5.9	55.1	9.2
Value	-	-	2.7	23.2	4.6	43.6	7.3
Tuna (in oil) 1/:							
Quantity	-	2.5	-	19.4	293.5	2,953.8	293.8
Value	-	3.9	-	18.5	251.5	2,273.0	251.5
Tuna (in brine) 1/:							
Quantity	44.7	189.5	-	-	-	2.2	44.7
Value	38.0	158.6	-	-	-	2.5	38.0
Bonito (in oil):							
Quantity	0.3	0.3	-	-	1,160.1	5,467.0	1,160.4
Value	0.2	0.2	-	-	952.9	4,173.9	953.1
Bonito (in brine):							
Quantity	279.5	2,589.0	-	-	9.8	20.6	289.3
Value	215.1	1,992.3	-	-	7.9	15.8	223.0
Tuna (in jelly or tomato paste) 2/:							
Quantity	-	6.7	-	0.2	85.0	543.3	85.0
Value	-	5.2	-	0.1	52.5	331.7	52.5
Other tuna and bonito:							
Quantity	17.1	64.7	1.8	18.0	818.9	6,272.5	837.8
Value	16.1	51.4	1.3	13.5	544.8	4,085.0	562.7
Total quantity	1,696.2	15,070.5	214.5	2,254.0	2,519.1	17,377.1	4,429.8
Total value	1,590.9	13,977.1	196.0	2,020.0	1,936.3	12,628.5	3,725.2

1/Excluding albacore.
2/Excluding albacore and bonito.

tuna amounted to 34,700 tons valued at \$28.6 million. This canned tuna was sold in 77 countries, of which the United States, West Germany, and Canada were the leading markets. Their combined purchases accounted for 78 percent of all canned tuna shipped and 80 percent of the total value. Canned tuna amounting to 15,000 tons, valued at about \$14 million, was exported to the United States. The shipments to the U. S. accounted for 43 and 48 percent, in quantity and value, of the total exports of Japan's canned tuna. (Fisheries Attache, United States Embassy, Tokyo, January 25, 1966.)

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FROZEN SWORDFISH EXPORT
VALIDATIONS TO THE U. S.
AND CANADA, APRIL-DECEMBER 1965:

Japanese export validations of frozen broadbill swordfish (fillets, chunks, and "other" forms) to the United States and Canada in December 1965 totaled 422 short tons valued at US\$300,319. This compared with validations of 363 tons valued at \$278,753 for November 1965 and 469 tons valued at \$307,860 in December 1964.

For the 9 months April-December 1965, Japan's export validations of frozen swordfish to United States and Canada totaled 3,536 tons valued at \$2.6 million. Fillets accounted for 64 percent of the total, with the remainder made up of chunks and other forms. For the same 9 months in 1964, the frozen swordfish export validations totaled 2,962 tons valued at \$1.9 million. (Fisheries Attache, United States Embassy, Tokyo, Feb. 24, 1966.)

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KING CRAB MOTHERSHIP LICENSED TO
OPERATE IN EASTERN BERING SEA:

Licenses for 5 Japanese fishing companies to process (can) king crab in the eastern Bering Sea during the 1966 season have been issued by the Japanese Fisheries Agency. The 5 companies will operate jointly with the factoryship Dainichi Maru (5,859 gross tons). The factoryship departed from Japan on March 1, 1966. The mothership has a fleet of 9 "Kawasaki" vessels (portable launch-type vessels or skiffs) and 5 catcher boats. The 1966 season operations were licensed for March 1 to December 31, 1966. It is anticipated, however, that the operations will probably be completed before the expiration

Japan (Contd.):



"Kawasaki" vessel or skiff used to take lines and supplies from the mothership to the catcher boats.

date of the licenses. (Fisheries Attache, United States Embassy, Tokyo, March 7, 1966.)

HERRING WILL BE IMPORTED FROM U. S. S. R. IN 1966:

As a result of consultations with the Hokkaido Government, the Hokkaido Fishermen's Federation, and the Aomori Prefectural Government, the Japanese Fisheries Agency decided to import 4,500 tons of Soviet-caught herring in 1966 (4,000 tons last year) and to allocate 4,300 tons to Hokkaido and 200 tons to Aomori Prefecture. As in 1965, the Herring Import Project Association will purchase herring at sea and deliver them to the Hokkaido Fishermen's Federation. The Federation will produce dried herring and herring roe.

Importation of Soviet-caught herring was started in 1960 to allow fishermen in Hokkaido to process herring to make up for poor catches. However, since Aomori Prefecture is exporting apples to the Soviet Union in a barter trade for herring (exports last year were 2,000 tons), the Aomori Prefectural Government demanded and was granted an allocation of herring. (Asahi, Mar. 19, 1966.)

EXPORTS OF FROZEN RAINBOW TROUT, DECEMBER 1965:

Japan's exports of frozen rainbow trout in December 1965 increased as compared with

Japan's Exports of Frozen Rainbow Trout by Country of Destination, December 1965

Destination	Quantity	Value
	<u>Short Tons</u>	<u>US\$</u>
United States	117	88,512
United Kingdom	22	14,145
Belgium	7	5,081
Canada	22	17,678
Netherlands	10	7,575
Other	3	2,796
Total	181	135,787

Source: Japan's Bureau of Customs.

the previous month--about 18 percent in quantity and about 23 percent in value. There were substantial increases in exports to the United States, the United Kingdom, Canada, and the Netherlands. Exports to Belgium dropped considerably. (Fisheries Attache, United States Embassy, Tokyo, March 15, 1966.)

EXPORTS OF MARINE PRODUCTS, OCTOBER 1965:

Japan's exports of marine products in October 1965 consisted principally of fresh and frozen fish valued at over \$6 million and canned products valued at almost \$12 million.

Japan's Exports of Marine Products, October 1965		
Product	Quantity	Value
	<u>Metric Tons</u>	<u>US\$ 1,000</u>
<u>Fresh & frozen:</u>		
Tuna, skipjack	946	167
Tuna, other	11,814	3,872
Marlin	621	586
Sea bream	251	55
Mackerel	399	67
Saury	386	117
Salmon	31	50
Other fish	3,093	1,255
Total fresh & frozen	17,541	6,169
<u>Cured:</u>		
Cod	5	6
Boiled and dried	56	25
Shark fins	96	158
Other	22	22
Total cured	179	211
<u>Shellfish, etc., frsh., froz., dried:</u>		
Scallops	1	6
Oysters	13	14
Shrimp	169	328
Squid	1,740	519
Octopus (fresh)	41	19
Whale meat	2,219	500
Frog legs	94	161
Other	30	39
Total shellfish, etc.	4,307	1,586
<u>Canned:</u>		
Salmon	2,988	3,945
Tuna, skipjack	1,450	1,175
Tuna, other	2,057	1,933
Mackerel	2,710	969
Saury	65	33
Sardine	55	28
Horse mackerel	422	150
Other fish	1,758	1,306
Crab	487	1,394
Shrimp	121	253
Squid	325	136
Other shellfish	787	647
Total canned	13,225	11,969
<u>Other products:</u>		
Seaweed, Kombu	86	53
Agar agar	32	119
Seaweed, laver 1/	241	6
Whale oil (baleen)	7,300	166

1/In 1,000 sheets.

Japan (Contd.):

(Fisheries Attache, United States Embassy, Tokyo, Feb. 16, 1966.)

FOREIGN TRADE IN FISH MEAL UP IN 1965:

Japanese foreign trade in fish meal in 1965 was valued at US\$18,447,135, of which \$16,381,269 were imports, with exports valued at \$2,065,866. Japan's imports of meal in 1965 increased 21 percent in value over the previous year. Export values increased from \$834,000 in 1964 to \$2,065,866 in 1965. The sharp increase in exports is attributed to good demand and high prices in overseas markets.

Table 1 - Japan's Exports of Fish Meal by Country of Destination, 1965		
Country of Destination	Qty.	Value
	Metric Tons	US\$
Ryukyu Islands	1,245	202,215
Taiwan	2,229	324,839
Hong Kong	355	54,216
South Vietnam	26	3,819
Fed. of Malaya	380	60,210
Singapore	995	151,470
Philippines	6,708	1,053,120
Ceylon	304	53,100
West Germany	600	125,400
Brazil	1	600
So. Africa Republic	210	36,680
Mariana Islands	1	197
Total 1965	13,054	2,065,866
Total 1964	6,202	834,000

Source: Japan Oils and Fats Export and Import Association.

During 1965, the principal suppliers were, in order of importance, Peru, Republic of South Africa, South-West Africa, and the U.S.S.R. Approximately 50 percent of meal imports were supplied by Peru. The most

Table 2 - Japan's Imports of Fish Meal by Country of Origin, 1964 and 1965				
Country of Origin	1965		1964	
	Quantity	Value	Quantity	Value
	Metric Tons	US\$	Metric Tons	US\$
Communist China	2,061	328,844	99	15,294
United States	973	133,967	1,429	187,112
U.S.S.R.	6,734	1,007,739	-	-
Argentina	198	22,561	126	12,794
Repub. of So. Africa	32,516	4,753,703	15,741	2,140,052
Peru	57,972	8,221,781	83,474	11,127,675
Australia	-	-	133	12,711
South-West Africa	10,693	1,679,144	711	96,400
Hong Kong	1/	503	-	-
North Korea	504	82,258	-	-
Samoa	-	-	281	42,203
Angola	993	150,769	-	-
Thailand	-	-	30	3,850
New Zealand	-	-	253	25,402
Total	112,644	16,381,269	102,277	13,663,493

1/Quantity not reported.
Source: Japan Oils and Fats Import and Export Association.

important export market was the Philippines with purchases valued at \$1,053,120, or about 50 percent of the total export value. (Fisheries Attache, United States Embassy, Tokyo, March 22, 1966.)

CONTRACTS FOR SALE OF ANTARCTIC WHALE OIL:

Export contracts for a total of 32,000 metric tons of Antarctic whale oil produced by three Japanese whaling companies have been concluded with British, Dutch, and other European companies. The highest price is US\$258 a ton for 6,000 tons to the Dutch company (delivery at leading ports in Europe). In all contracts, the price is at least \$252, the highest for the past few years. Under the new contracts the average export price (delivery at port to be designated by the buyer) is about \$14-20 a ton higher than the average price in 1965. This is attributed to an improvement in the world oil market and the prospects of decreased production due to a cut in the catch quota in Antarctic whaling.

In 1966, Japanese production of Antarctic whale oil is expected to be 5,000 to 6,000 tons below the planned production of 47,000 (40,000 tons being allocated for export). The decrease in production is expected to occur because the three whaling companies put emphasis on the catch of baleen whales rather than fin back whales (from which oil is obtainable in the largest quantity) due to a good demand for whale meat. The Japanese export quantity of whale oil for 1966 is estimated to be 31,000 to 33,000 tons, after deducting 9,000-10,000 tons allocated for domestic use, or less than one-half of the actual export quantity (72,000 tons) in 1965. (Nihon Keizai, Feb. 15, 1966, and The Japan Economic Journal, Feb. 22, 1966.)

EXPLORATORY FISHING OFF AUSTRALIA:

Australian observers joined the Japanese fisheries vessel Sugura Maru during an exploratory fishing cruise off the southern and western Australian coasts in November 1965.

The Sugura Maru of 350 tons is under charter to the Japanese Fishing Agency. She has a crew of 24 and is equipped with a comprehensive array of fishing gear, including demersal long lines, drift nets, traps, beam trawls, and long lines.

Japan (Contd.):

Bottom long-lining was carried out in varying depths to about 100 fathoms. As much as three miles of line was set at different stations along the coast. Twenty stations were fished in this manner during the voyage.

Whale shark of many species constituted the bulk of the catch. These were headed, gutted, and frozen for eventual processing into fish sausage in Japan.

Small snapper up to 18 inches long, which are frozen whole and served in Japanese restaurants as whole fish, were most sought after, but the snapper fishing was not particularly good--certainly not in commercial quantities.

A trammel net was set for shrimp in 42 fathoms west of Shark Bay. Although the net was badly damaged by shark, two king shrimp were caught. One Australian observer said this could be an indication that the shrimp in Shark Bay, on reaching a certain stage of maturity, migrate to deeper waters on the Continental Shelf.

In Cambridge Gulf, dredging with a modified scallop dredge had poor results. (Australian Fisheries Newsletter, February 1966.)

WEST AFRICAN TRAWLERS CHANGE FISHING POLICY:

Exports of fish caught by Japanese pelagic trawlers off the coast of West Africa have been decreasing sharply due to the changing business policy of operator fishing firms.

Because of a marked advance of domestic prices of frozen fish caught off the coast of West Africa, Japanese trawlers operating off the African coasts have begun to attach top importance to catching "high-grade" fish for Japanese consumption in preference to "low-grade" fish they used to catch for "spot exports" to coastal African countries, such as Ghana, Nigeria, Liberia, and Sierra Leone, and to European customers, including Italy and Greece.

This trend has become particularly noteworthy since the summer of 1965 especially as regards the "Big 2" fishing firms. Those two companies have reduced the volume of spot exports from catches in West African

waters by around 60 percent. As a result, nearly 80 percent of the total catch by their trawlers operating off the West African coasts have been brought back to Japan lately.

Japanese fishing circles ascribed this new tendency to the following reasons:

(1) High-grade fish brought back to Japan are sold on the Japanese market at an average price of 150,000 yen (US\$417) a ton. The price has been rising annually by 10 percent.

(2) In contrast, the average export price of low-grade fish bound for coastal countries has remained low, about 60,000 yen (\$167) a ton. No price advance in the future is likely due to competition by other fishing countries, such as Poland and the Soviet Union.

(3) Payment by coastal countries for fish purchases is not regular due to foreign currency scarcity. (Japan Economic Journal, Feb. 15, 1966.)



Jordan

FISHERY TRENDS IN 1965 AND OUTLOOK FOR 1966:

No gains were realized in Jordan's under-developed fishing industry during 1965, and the outlook for 1966 reveals no plans for increasing production. Nevertheless, it is significant that Jordan acquired 19 kilometers (11.8 miles) of coastline in a land swap with Saudi Arabia, making Jordan's coastline approximately 25 kilometers (15.5 miles) long. This might spur individual fishermen to increase catches in the new coastal waters, but no significant steps have been taken to add to the industry's capacity. The main obstacle seems to be Jordan's inability to secure agreement with Saudi Arabia to allow use of



Jordan (Contd.):

the latter's territorial waters for periods longer than one year. Saudi Arabia continues to supply the major portion of Jordan's fish import needs.

The development potential of Jordan's fishery resources has long been recognized by the Jordan Government. It was given explicit recognition in the new Seven-Year Plan. The Government of Jordan would be interested in receiving suggestions and participation from United States and other interested parties for the improvement and expansion of its fishing industry. The Jordan Government has requested technical assistance from the United Nations Special Fund for its deep-sea fishing project in Aqaba but no response had been received as of March 1966. The Fund had previously provided an advisor to carry out a survey on inland fishing, the results of which should be available during 1966. (United States Embassy, Amman, March 18, 1966.)

**Republic of Korea****BUREAU OF FISHERIES ESTABLISHED:**

The Republic of Korea will establish a Bureau of Fisheries, stated Korean President Chon Hui Pak in a "State of the Nation" speech to the National Assembly on January 18, 1966. The main functions of the new Bureau will be the enactment of a basic law on fisheries, the improvement of fishing techniques, and the development and expansion of Korean fisheries. (U. S. Embassy, Seoul, January 21, 1966.)

**Liberia****ATLANTIC TUNA FISHERIES:**

The tuna species found off the Liberian coast include skipjack, yellowfin, big-eyed, and albacore. Fishing areas for all those species are about 20 miles offshore. Skipjack and yellowfin are caught in that area in great abundance. Principal and minor grounds are not known, but it is known that all tuna fishing grounds are offshore. Skipjack and yellowfin are fished all year from Dakar to Luanda on the west African coast.

The principal fishing methods are: (a) skipjack and yellowfin--pole fishing with live bait; (b) yellowfin and big-eyed--long-line fishing with dead bait; (c) yellowfin and skipjack--purse seine.

Types of vessels: (a) 15 Korean long-liners (75 gross tons); (b) 3 Korean long-liners (340 tons); (c) 6 Japanese pole-fishing boats (125 tons); (d) 25 French pole-fishing boats (60 tons); (e) 2 Spanish purse-seiners (80 tons); (f) about 30 long-liners of different nationalities (75 tons).

There is one cold-storage plant which is located near the Free Port. It has a capacity of 1,800 metric tons. There are no plans for expansion. No research is at present being done on tuna in Liberia. (United States Embassy, Monrovia, Feb. 17, 1966.)

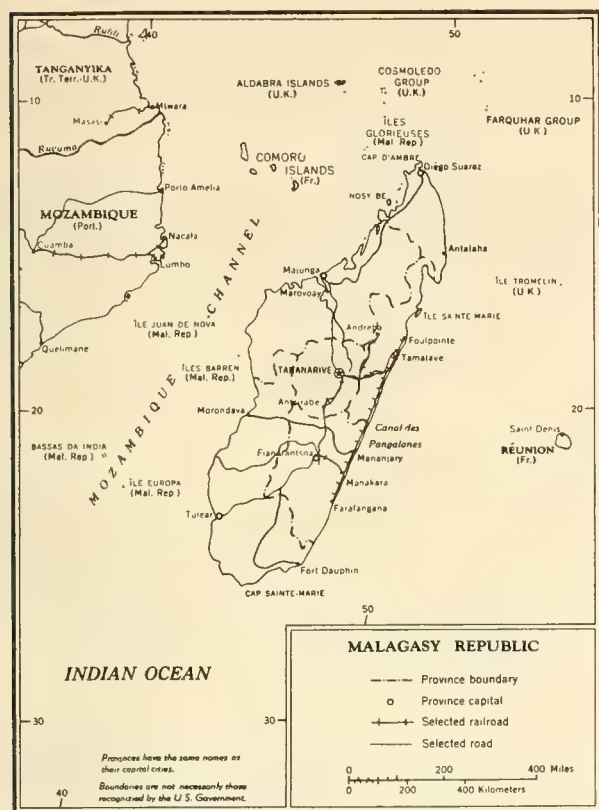
**Malagasy Republic****JOINT FISHING VENTURE IN MALAGASY REPUBLIC TO EXPAND:**

A major Japanese fishing company has decided to expand operations of a joint shrimp-fishing venture with the Malagasy Republic. Terms having been agreed upon with the Malagasy investors, the Japanese company has applied for a license for the investment from the Japanese government agencies concerned.

Originally capitalized at 27 million yen (US\$75,000), the capital of the joint venture is to be increased to 130 million yen (\$361,000) by additional participation of the Japanese stockholders and a French-affiliated cold-storage company. The investment ratio will be 51 percent for the Malagasy side and 49 percent for the Japanese side. The management will be composed of 4 persons of the Malagasy side and 3 of the Japanese side, the presidency being filled by the Minister of Agriculture of the Malagasy Republic. The Japanese will be in charge of actual fishing operations, processing, and sales.

The joint venture was established in October 1963 to fish for shrimp in the Straits of Mozambique, off the west coast of Malagasy. The annual catch of shrimp by the expanded concern is projected at about 900 metric tons, valued at 300 million yen

Malagasy Republic (Contd.):



(\$833,000), to be exported to Japan and the United States. (*Nihon Keizai*, Feb. 23, 1966.)

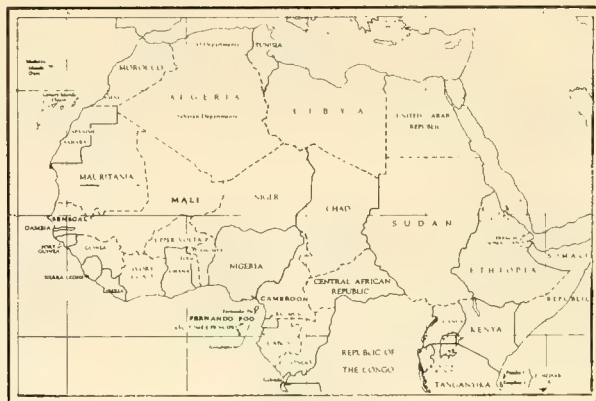


Mauritania

NEW COLD-STORAGE AND PROCESSING PLANT:

A new, large, fish-freezing and processing plant began pilot operations in January 1966 in Port Etienne, Mauritania. The plant represents an investment of about US\$3 million believed to be entirely private French capital. It is reported to be the largest and most modern fish-freezing and processing plant in western Africa and perhaps in all of Africa, with the possible exception of an operation in Cape Town, South Africa. The plant has a storage capacity of 5,000 tons at -18°C . (0°F .), a freezing capacity of 100 tons a day at -40°C . (-40°F .), and an ice-making capacity of 60 tons a day. The plant operators intend to contract for the pur-

chase of fish from French, Spanish, and Japanese trawlers fishing the reportedly lucrative grounds off the coast of Mauritania.



Processing operations will include: filleting; heading, gutting, and similar operations appropriate to the species; and packaging. The products are to be exported primarily to the European market. It is possible that some products, such as fish blocks, will be suitable for the United States market. (United States Embassy, Nouakchott, Jan. 4, 1966.)



Mexico

FOREIGN FISHING ACTIVITIES OFF MEXICO'S COASTS:

The appearance of large Soviet fishing vessels in the Gulf of California, renewed Soviet fishing in the Gulf of Mexico, and increased fishing by the Japanese is causing concern among Mexican fishermen. The Foreign Ministry explained to reporters that the Soviets are free to fish in the Gulf of California for although the Gulf juts some 700 miles up into Mexico, its waters (save those along the coasts) are international.

In mid-March 1966, the Mexican Ministry of the Navy ordered the Mexican Coast Guard to increase vigilance in coastal waters and particularly along the Yucatan Peninsula. The orders stem from recent poaching incidents and armed encounters in Mexican waters.

On March 17, the Cuban fishing vessel Lambda 17 was reportedly attacked and sunk by an unidentified vessel. The twenty crewmen of the Lambda 17, who were picked up

Mexico (Contd.):

by other Cuban vessels operating in the area, told Mexican authorities that they were attacked without reason. They said they were fishing outside Mexican territorial waters. The Lambda 29, carrying a crew of 13, limped into the port of Progreso, Mexico, on March 16, after being fired upon by another unidentified vessel.

Another Cuban fishing vessel, the Escribano Ro-13, was seized by a Mexican Coast Guard patrol near the Isla de Mujeres, where the crew was held pending legal proceedings for unauthorized entry of Mexican territorial waters. (The News, Mexico, Mar. 19, 20, 21, 1966.)



Morocco

SARDINE FLEET DAMAGED BY STORM:

A severe storm accompanied by high winds and waves struck the Atlantic coast of Morocco the night of February 20-21, 1966. Ports from Tangier south to Agadir suffered damages but the fishing port of Safi was hardest hit. A total of 42, or over a third of the 30- to 60-ton-class sardine vessels in the port, were sunk and 22 were seriously damaged. Another 9 smaller motorized fishing boats were sunk. The only vessels which escaped damage were those in drydock. The



disaster is particularly felt since the boat owners customarily own only 1 or 2 vessels at most and many are owned on a share basis. Many of the vessels were uninsured following local practice of insuring them only during the actual fishing season from approximately May to December.

The Government moved quickly to assure the thousands of families depending on fishing and the fish-canning industry that every effort would be made to restore the fleet as much as possible by the opening of the season. (United States Embassy, Rabat, March 7, 1966.)



Nigeria

JAPANESE SURVEY NIGERIAN FISHING INDUSTRY:

A nine-man Japanese Survey Mission arrived in Lagos on February 15 to begin a five-week survey aimed at establishing a fishing port in Nigeria. The team consisted of 4 engineers, 4 economists, and 1 fishing expert. The survey was provided by the Japanese Government under its technical assistance program.

Nigeria relies heavily on imported supplies for meeting its demand for fish. The Food and Agriculture Organization (FAO) has estimated that 75-80 percent of Nigeria's annual consumption of fish comes from imports at a cost in foreign exchange of about US\$23.8 million. Norway alone supplied \$8.9 million worth of stockfish to Nigeria in 1965. Development of an efficient local industry, therefore, could effect considerable savings in foreign exchange while providing more employment in Nigeria. (United States Embassy, Lagos, Feb. 26, 1966.)

LAKE CHAD FISHERY DEVELOPMENTS:

In late 1965 the Federal Fisheries Service of Nigeria established a research station at Lake Chad, consisting of a laboratory, workshop, and office quarters for three fresh-water biologists.

The major objectives will be to determine fish stocks, potential, rate of fishing the waters can stand, and conservation measures necessary in order to maintain maximum production.

Nigeria (Contd.):

The experimental work will get under way sometime in September 1966 when two research launches (42 footers) are expected to arrive at Malamfatori on Lake Chad.

In 1965, the World Bank signed an agreement with the Government of Nigeria for extensive road construction in the Northern Region, including a road from Maiduguri to Malamfatori. Construction on this road has begun and it is expected to be completed within about two years. The completion of this road is essential for future distribution in the North and elsewhere in Nigeria for fish caught in Lake Chad.

The annual yield in Lake Chad is estimated at 40,000 metric tons. However, the Federal Fisheries Service, Lagos, feels certain that a systematic testing of the lake's resources with the two launches may confirm the possibility that Lake Chad's annual fish yield in future years may reach as high as 100,000 tons. It is likely that the research station may, by late 1967, have determined whether an annual yield of this magnitude is possible. If so, it should make a significant economic contribution to Nigeria as well as to Chad, Cameroun, and Niger. (United States Embassy, Lagos, March 27, 1966.)



Norway

HERRING FISHERY OPENS WITH HEAVY CATCHES IN EARLY 1966:

The first phase of the 1966 Norwegian winter herring fishery was concluded on February 19, 1966, with a total recorded catch of 2,750,000 hectoliters (255,750 metric tons) with an ex-vessel value of Kr. 80 million (US\$11.2 million). More than two-thirds of the catch went to fish meal and oil plants. The 1966 catch was much greater than comparable catches in 1965.

The second phase of the Norwegian winter herring fishery (the period after the herring have started to spawn and quality is consequently lowered) started on February 21. Weather conditions were good and herring were abundant. The total Norwegian winter herring catch could exceed 4.5 million hectoliters (418,500 tons). (United States Embassy, Oslo, February 27, 1966, and other sources.)

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NEW AUTOMATED PURSE SEINERS FOR HERRING FISHERY:

The building of fishing vessels in Norway has been stimulated by good herring catches in 1965 and early 1966. One of Norway's largest shipbuilding firms is said to be building a new type of herring purse seiner costing about US\$420,000. The vessel is 125 feet long and has 2 decks, making it possible to maintain stability while taking loads of up to about 465 metric tons. The vessel is equipped with power block, two side propellers for better maneuvering, and a herring pump that sucks fish out of the purse seine. The first of the new herring vessels was scheduled for delivery in February 1966. (The Export Council of Norway, February 1966.)

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CANNED FISH EXPORT TRENDS, JANUARY 1-DECEMBER 25, 1965, WITH COMPARISONS:

In 1965, Norwegian exports of canned brisling were down somewhat from 1964, while exports of small sild and kippered herring were up slightly, according to preliminary data. But in 1965, stocks were down and fishing for small sild was disappointing.

During January 1-December 25, 1965, exports of the principal items in standard cases (100 $\frac{1}{4}$ cans) were as follows (comparable 1964 data in parentheses): brisling 385,000 cases (412,000 cases), small sild 919,000 cases (875,000 cases), and kippered herring 257,000 cases (247,000 cases).

During January 1-October 31, 1965, exports of canned crab were 675 metric tons (665 tons in 1964), and exports of canned shrimp were 375 tons (756 tons in 1964).

The pack of canned brisling during January 1-November 13, 1965, was 389,000 standard cases (about the same as in 1964) and that of small sild was 580,000 standard cases (down 18 percent from 1964).

Stocks of brisling and small sild were short in late 1965. The short 1965 pack of small sild was causing concern. In addition, carryover stocks of canned brisling have gradually been reduced over the last several years by an upward trend in sales.

The United States was the principal market for Norwegian canned fish exports in the first 10 months of 1965 taking 9,190 tons valued at Kr. 52 million (US\$7.3 million), a gain

Norway (Contd.):

of 10 percent in quantity and 15 percent in value over the same period of 1964. Other important markets for Norwegian canned fish are Great Britain, continental European countries, South Africa, Canada, and Australia. (*Norwegian Cannery Export Journal*, December 1965 and January 1966.)



Panama

FISHERY DEVELOPMENTS, 1965:

Shrimp Fishery: Unofficial figures show that shrimp exports in Panama for the first nine months of 1965 of about 8 million pounds were below the 9.6 million pounds exported in the same period of 1964. The value of the shrimp catch in 1965 for the first nine months was US\$5.7 million as compared to almost \$5.3 million in the same period of 1964. A higher percentage of premium-grade shrimp was caught and higher prices were obtained in the U. S. market, accounting for the increase in the value of the catch in 1965. As in the past, the entire shrimp catch was exported to the United States.

Panamanian fishery officials estimated that the total 1965 shrimp catch probably was



Fig. 1 - One of the more modern Panamanian trawlers which has just unloaded a cargo of shrimp at a freezing plant in Panama City.

slightly lower than the average of 12-13 million pounds landed in the last three years and considerably below the 15.5 million pounds taken in 1964. Nonetheless, higher market prices and the high percentage of premium-grade shrimp caught during the year should bring the dollar value of the catch to over \$7



Fig. 2 - Three shrimp plants (one off picture to the left) are concentrated in this area of Panama City.



Fig. 3 - This shrimp firm in Panama City has its own fleet, and marine ways for repair of both its own fleet and independent vessels that fish for the plant.

million, although officials of at least one large local shrimp concern believe this estimate may be high in view of reportedly extremely poor fishing conditions in November and December 1965. Government officials predicted that Panama's annual shrimp catch will level out at about 12-13 million pounds per year, pending the development of equipment capable of fishing below 50 fathoms. Practically all shrimp waters inside the 50-fathom line on Panama's Pacific coast currently are being fished. Little is known of the shrimp population out beyond 50 fathoms. Premium-grade white shrimp generally are caught at about the 12-fathom line, while the valuable pinks are fished between 30-45 fathoms. "Titi" and "carabali" usually are caught in shallower waters around river mouths. Estimates of the above types during the next several years will be: whites 4.3 million pounds; pinks 2.5-3.0 million pounds; "titi" 5.0 million pounds and "carabali" 0.6-0.8 million pounds.

Panama (Contd.):



Fig. 4 - Shrimp trawlers docked at the village of Pedregal near David in Chiriquí Province.



Fig. 5 - A basket of shrimp, mostly white, moves on a conveyer belt into the plant at the village of Pedregal. Shrimp are kept on board the vessels in chilled brine which sometimes forms ice.

Concern continues to exist regarding the possible necessity for the establishment of shrimp conservation measures in local waters. While opinion varies, the industry generally believes recent government actions limiting the number of boats authorized to fish for shrimp on the Pacific Coast to 254 will safeguard the current shrimp population. During 1965, it is estimated that between 205-210 vessels actually were operating during most of the year. It is unlikely that the full number authorized actually will fish at any one time because of the necessity for repairs,



Fig. 6 - Two sorters used to separate the shrimp by size--one for large and the other for "titi"--in a shrimp plant in the Paitilla district of Panama City.



Fig 7 - Removing frozen shrimp from freezers in a Panamanian shrimp plant.

sales of vessels to foreign enterprises, and the failure of some companies to construct vessels authorized for construction.

Fishing conditions were only fair during 1965 and industry spokesmen claim catches during November and December were abnormally low even considering that those months usually are a "slack" period. The same sources report that unusual northerly winds during early 1966 prevented cold water from moving inshore and that shrimp catches consequently remained poor through the first six weeks of the year. Apparently in normal years upwellings of cold water bring increased food for shrimp and improve the quality and quantity of the catch.

Panama (Contd.):

Buoyed up by a record 1964 year, the financial condition of the local industry generally is good with a number of companies making substantial inroads into backlogs of indebtedness built up earlier in the decade. Individual fishermen and boat operators continue to be plagued by high operating costs and spotty fishing conditions, but despite this, money has been found to modernize many of the vessels, and the general status of the fleet is good.

Fish Meal and Oil Industry: A prophesied increase in the production of fish meal and fish oil at the country's single operating fish-reduction plant was realized. Production of fish meal was 6,250 short tons and fish oil production was 1,554 short tons, more than double the production for 1964. Fishing for anchovy and thread herring during 1965 and early in 1966 was excellent (but catch figures were not available); this was undoubtedly a major factor in the increased fish meal and oil production.



Fig. 8 - Panamanian fish meal plant.

An official of the only fish meal company indicated that the firm's fish meal was sold to the United States (2,100 tons), West Germany (1,754 tons), and Central America (925 tons). About 1,500 tons were sold locally. All fish oil exported by the company was sold to West Germany (1,240 tons), with 258 tons consumed locally.

Contrary to earlier expectations, a fish meal plant under construction by Panamanian-Peruvian interests on Taboguilla Island several miles off the Pacific coast near Panama City failed to begin operations during 1965. It was expected that the \$2 million plant would be completed and in operation by mid-1966. Three of 10 standard anchovy fishing vessels ordered by the firm from a Peruvian shipyard were in Panamanian waters. Trial runs of at least one of the vessels indicated some difficulty in adapting the large purse seiners to Panama's shallow waters.

However, the management of the local firm was confident necessary adjustments could be made and fishing techniques developed to permit optimum use of the boats by the time the Taboguilla plant would be ready to begin operations. The plant will have a capacity of 35-50 tons of fresh fish per hour. Most of the equipment of modern design is already in Panama. A shipyard also will be constructed on the island to repair the company's fleet and to build additional fishing vessels.



Fig. 9 - Bagged fish meal is stored in this well-ventilated building prior to shipment.

No figures were available regarding the dollar value of the fish meal and oil production for 1965. However, assuming average prices of \$150 per ton for fish meal and \$180 per ton for fish oil, local production may have had a value of over \$900,000 for fish meal and \$275,000 for fish oil during the year. Panamanian fish meal, because of its high protein content, is sold at premium prices in world markets. Panama's Bureau of Fisheries estimates that 1966 production of fish meal and fish oil may have a value in excess of \$2 million, provided that the Taboguilla plant begins operations by mid-year.

Dr. William Baylif, an employee of the Inter-American Tropical Tuna Commission, prepared an excellent study concerning the anchovy population in waters adjacent to Panama City. Field work was conducted during 1963-1964 and the results were subsequently published by the University of Washington at Seattle as a doctoral dissertation. Among Dr. Baylif's observations was the comment that almost twice the number of anchovy are found in shallow waters east of Panama City compared to areas west of the same city.

Other Developments: Imports of canned fish products (mostly sardines) and dried fish (mostly cod) for domestic consumption during the year remained high and may have exceeded-

Panama (Contd.):

ed \$2 million in value. Requirements for fresh fish were met by independent fishermen, several small cooperatives, and from fish caught in conjunction with shrimp fishing.

During the year, a Spanish firm conducted a survey of both Pacific and Atlantic coast waters to determine the availability of bottom fish for a canning or frozen fish-packing operation in Panama. It is understood that the results of the survey were not encouraging and that the firm decided against investing in the industry in Panama at this time. The company's vessel, equipped for both echo-sounding and trawling to a depth of 300 fathoms, spent 18 days in Atlantic coast waters and approximately 30 days surveying Pacific coast waters. Apparently no significant potential fishing areas were found on the Atlantic coast. Few areas suitable for trawling were found, due to the high incidence of both rock and coral along the entire Atlantic coast. Results of the Pacific survey by the vessel were not known, but the lack of immediate interest on the part of the company in engaging in fishing operations caused speculation that the results of this survey also were not promising. It is understood that U. S. interests were investigating possibilities for financing a plant to process sardines locally.

A detailed survey of Central American fisheries, including Panama, was approved for financing by the United Nations Special Fund on January 15, 1966. The United Nations Food and Agricultural Organization was to conduct the survey beginning in April 1966, if participating countries make agreed monetary contributions on schedule. A program to provide for the teaching of oceanography at the National University was under study by UNESCO. The abundance of sharks in Panamanian waters could lead to the eventual establishment of a small local shark-fishing industry.

A Decree Law, dated October 14, 1965, prohibiting "fishing for all species of seafood within the territorial waters 12 miles from the coast (in certain specified areas) by fishing boats of ten gross tons or over," was one of two significant pieces of fishery legislation approved during 1965. The above decree law, designed to protect small fishermen and cooperatives, primarily in the El Farrallón area about 70 miles west of Panama City,

alleges that in certain areas high-powered fishing vessels with modern equipment made inroads into the catch, and consequently into the incomes, of small fishermen. The law was subject to some criticism on the part of local shrimp companies. The law represented no change in Panama's traditional view that national jurisdiction extends 12 miles into territorial seas for fishing purposes.

A second Decree Law, dated March 12, 1965, was passed ostensibly to induce additional investment in Panamanian fisheries. However, according to some industry spokesmen, provisions of the law restricting the importation of vessels and equipment for use by local companies actually curtailed investment in the local industry. Representations were being made by local shrimp companies to the Ministry of Agriculture, Commerce and Industries for a revision of the law to terms more favorable to their interests. (U. S. Embassy, Panama, March 2, 1966.)



Peru

FISH MEAL PRODUCTION AND ANCHOVY CATCH, JANUARY-FEBRUARY 1966:

Peruvian fish-meal production in January 1966 set an alltime official record of 242,380 metric tons; however, the estimated production for February dropped to 174,905 metric tons.

Based on production figures, it was estimated that anchovy landings for January 1966 were 1.6 million tons and for February were 1.2 million tons. So far this fishing season (October 1, 1965-June 30, 1966), anchovy landings have been estimated at 5 million tons. As the Government of Peru has limited this season's catch to 7 million tons, 2 million tons remain to be caught.

Fish oil production was down as the percentage of "peladilla" (immature fish) was high, reducing the oil recovery as well as producing less fish meal per ton of fish. (United States Embassy, Lima, March 13, 1966.)

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REDUCTION PLANTS BUY NORWEGIAN EQUIPMENT TO PROCESS FISH SOLUBLES:

Some Peruvian fish-reduction plants have ordered supplementary processing equipment

Peru (Contd.):

from a Norwegian firm. The additional equipment consists of steam dryers and other installations making it possible to process fish solubles, a byproduct of fish reduction to meal. At present, only a few Peruvian plants have such equipment. (The Export Council of Norway, February 1966.)

Editor's Note: Apparently cost pressures within the Peruvian industry are leading some processors to maximize efficiency.



Philippine Republic

FISHING INDUSTRY DEVELOPMENTS, 1965:

Summary: The Philippine fishing industry continued throughout 1965 to struggle with many of the same problems which have plagued the industry for a number of years. Although there was an increase in production by marine and inland fishermen, production was still well short of consumption, necessitating a sizable import of canned fish products. Total imports for 1964, the latest year for compiled statistics from the Philippine Fisheries Commission, were 49,400 metric tons, valued at US\$14.4 million. This is a sizable cost in the use of scarce foreign exchange which could be avoided if the industry were able to fulfill the country's needs. This could be done, but the industry is plagued by lack of proper refrigeration, canning, icing, and transportation facilities. Despite these problems, however, the marine fishing industry increased production in 1964 by 24 percent to 258,000 metric tons. This was done with only a slight increase in gross registered tonnage of fishing vessels. The previous administration promised aid to the industry but the promises were never fulfilled. Whether the new administration will do otherwise has as yet not been spelled out. One dramatic change occurred in 1964 however, when South Africa's share of the import market dropped from 47.3 percent in 1963 to 10.3 percent in 1964, due to South Africa's apartheid policies.

Production and Consumption: The Philippines in 1964 produced 603,500 metric tons of fishery products, including shell buttons, reptile skins, shells and sponges, valued at US\$201.3 million. This was 10.3 percent more in quantity over 1963 when 547,300 tons were produced.



Fig. 1 - Republic of the Philippines.

The Commission of Fisheries divides its statistics on fish production into three categories: Commercial fishing, fish ponds, and municipal fisheries and sustenance fishing. Production, as in previous years, remains short of consumption which was estimated at 643,300 tons, or about 4.6 pounds per capita annually. A figure of 67.3 pounds per capita annually was established in 1964 by the National Research Council of the National Science Development Board as the minimum healthful requirement. Since this would require the availability of 954,200 tons, actual production in 1964 was 36.7 percent short of the requirement.

Imports and Exports: The exports of fish products, as reported in previous years, continues to be insignificant. In 1964, the Philippines exported only 964 tons of fish products valued at about \$615,300. This was a slight increase over 1963 in both quantity and value. The bulk of the exports consists of shell buttons, wet-salted fish, capis shells, and whole shells. A fledgling shrimp exporting business, which got under way in 1963,

Philippine Republic (Contd.):



Fig. 2 - Philippine purse-seine vessel, scouting waters off Palawan Island in Sulu Sea searching for schools of mackerel with echo-sounder, approaches mothership.

showed a drop in exports during 1964 when only 52 tons were exported valued at about \$57,000. The bulk of exports of all Philippine fishery products went to the United States (including Hawaii), Guam, and Japan.

In 1964, the Philippines imported 49,400 tons of fish products, roughly the same as 1963, when 49,800 tons were imported. The imports for 1964 were valued at \$14.4 million and consisted mostly of canned sardines and mackerel.

Since one of the basic staples of the Philippines is canned sardines from South Africa, the government's importing and marketing outlet, the National Marketing Corporation (NAMARCO), as well as private local importers were under considerable fire from critics during 1963 and early 1964 for importing sardines from South Africa. The country belongs to the anti-apartheid block in the United Nations and such imports were considered by many as antithetical to the bloc's call for economic sanctions against South Africa. This criticism apparently had considerable effect because in 1964 imports from South Africa dropped dramatically. Whereas in 1963, South Africa held 47.3 percent of the market with imports of 23,500 tons of fish products (mostly sardines), in 1964 South Africa accounted for only 10.3 percent of the market in quantity and 13.7 percent in value. Imports from South Africa were 5,100 tons valued at about \$1.9 million. This dramatic drop was partially covered by slightly increased imports from Japan, the United States, Canada, West Germany, and South Korea, as well as a swing away by consumers



Fig. 3 - Mackerel are lifted by scoop net from purse-seine net and dropped on vessel's deck.

from canned sardines to other canned fish. Japan improved its share of the market by a considerable margin. In 1963, Japan supplied only 33.8 percent of total imports; in 1964, her share jumped to 68.2 percent in quantity and 72.4 percent in value. The totals for 1964 were 33,700 tons valued at about \$10.4 million. The U. S. share of the market continued to drop from 5 percent in 1963 to 3.4 percent in 1964.

Inland Fisheries: Municipal fisheries and sustenance fishing shared almost equally with commercial fishing in the total production of 1964. Municipal fisheries produced 282,700 tons valued at about \$74.7 million, only slight increases over 1963. Production in another category of inland fishing, fish ponds, was 62,700 tons, virtually the same as the previous year.

Marine Fisheries: Although the marine fishing industry is plagued by lack of refrigeration facilities, transport, and marketing problems, it nevertheless managed to increase its annual production during 1964 by nearly 24 percent to a total of 258,000 tons. This increase was accomplished with only a slight increase in gross registered tonnage from 52,653 tons in 1963 to 55,499 tons in 1964.

Processing and Marketing: The commercial fishing industry, as in previous years, continues to be plagued by many problems: lack of adequate berthing and harbor facilities, lack of canneries, poor to nonexistent refrigeration and transportation facilities, and non-availability of investment capital and bank financing. The only canning facility, White Rose Packing Corporation, was established in 1964 but is not yet in operation. The Minda-

Philippine Republic (Contd.):

nao Development Authority is building two ice plants, one in Palawan and one in Zamboanga City, but neither are yet in operation.



Fig. 4 - Philippine fishermen from the port of Mariveles take in a nylon trammel fishing net which had been set the night before.

Government Activity: The previous administration pledged to help the industry through various means but virtually nothing was done. While the new President has not spelled out specifics with regard to the fishing industry, he has pledged his administration to a program of economic development which will provide basic food staples to the people. Since fish constitutes one of these

staples, attention to the ills of the fishing industry could help provide the needed production to eliminate the costly use of foreign exchange for imports.

It is too early to tell what Government attention will be given to the industry by the new administration. It is probable that some Government help will be extended. The Philippines will probably continue to import a sizable amount of its food needs for some years to come, but it would appear that most of this supply will now come from Japan with a small share distributed among the United States, Canada, South Korea, and West Germany. (United States Embassy, Manila, March 8, 1966.)



Poland

FISHERY TRENDS AND DEVELOPMENTS:

Planned Catch: Poland has ambitious plans for the development of her high-seas fisheries. Marine landings in 1970 will amount to 470,000 metric tons, according to the Polish Central Fisheries Board. This is 20,000 tons more than previously planned, and more than double the 1964 catch of 244,000 metric tons. In 1966, the Poles plan to catch 310,000 tons, about 10 percent more than in 1965 when their landings were estimated at 280,000 tons.

Fishing Areas: In 1965, Polish vessels operated in the following principal distant fishing grounds: the Norwegian Sea, the North Sea, the English Channel and the Banks south and west of Ireland; in the North Atlantic: the Icelandic Banks, the Labrador Sea, the Newfoundland and Nova Scotia Banks, the Georges Bank, and areas along the west African coast (especially off Senegal, in the Gulf of Guinea, and in Walvis Bay). The Baltic is also exploited by Polish fishing vessels--about one-fourth of all marine landings is taken there.

Fishing Fleet: Increased Polish landings will result partly from increased labor productivity, but principally from new additions to the fishing fleet. In 1960, the Polish fishing fleet consisted of 87,600 gross tons; by 1970 the Poles plan to add another 200,000 gross tons of new vessels. From 1960 to 1970, the gross tonnage of the Polish fishing fleet will increase by 228 percent, while the increase in fishery landings will amount to



Fig. 5 - Type of fish trap used in river estuaries of the Philippines.

Poland (Contd.):

only 179 percent. However, the Poles plan to decrease this differential rapidly. During 1960-1965, tonnage increased by 112 percent and landings only by 84 percent (see table 1).

Table 1 - Polish Fishing Fleet and Marine Fishery Landings, 1960, 1966, and 1970			
	1960	1966	1970
Fishing Fleet (gross tons)	87,600	185,000	287,000
Percentage increase over previous year (%)	-	112	55
Landings (metric tons)	168,300	310,000	470,000
Percentage increase over previous year (%)	-	84	52

Source: Zjednoczenie Gospodarki Rybnej, Warsaw, 1966.

In the 1966-1970 period, both increases will be more harmonious with fleet tonnage increasing by 55 percent and landings by 52 percent. This indicates better cost analysis and more careful planning, as well as greater efficiency in the vessels to be built in 1966-1970. Most will be capable of processing fish immediately and storing the processed catch in refrigerated holds for later delivery. It must not be forgotten, however, that these plans are yet to be confirmed by actual experience.

Fish Processing: Poland has ten major fish-processing plants. Almost all of them manufacture smoked and marinated fish products; more than half of them also can and produce special fish meal.

Wholesale (as well as retail) fishery trade organizations exist in 17 major Polish cities. They are serviced by refrigerated trucks or railroad cars often directly from the fishing vessels.

Exports: Polish fishery exports (amounting to over 11,000 metric tons in 1964 or almost double the 6,500 tons exported in 1960) are directed by the Central Board for Fisheries through the intermediary of "Animex" of Warsaw, an export-import firm. Direct exports of fish from vessels are increasing rapidly. According to Polish statistics, exports of marine fish (which in 1960 were nonexistent) increased to 5,600 metric tons in 1964. Most of the exports (frozen whole, frozen fillets, and salted) are delivered by Polish trawlers fishing nearby to West African countries; some frozen cod blocks are transshipped to the United States and Canadian markets via the French St. Pierre et Miquelon fishing base.

Fishing Enterprises: Poland has eight large state-owned and administered fishing firms (see table 2). Only three of them (Dalmor, Odra and Gryf), however, fish on the high seas with large stern factory trawlers and medium side trawlers. The remaining five firms own only small fishing cutters which do not permit distant operations. All Polish fishing enterprises engage in fishmeal production (indicating an increasing demand for this product which has so far been satisfied with increasing imports) and own netting

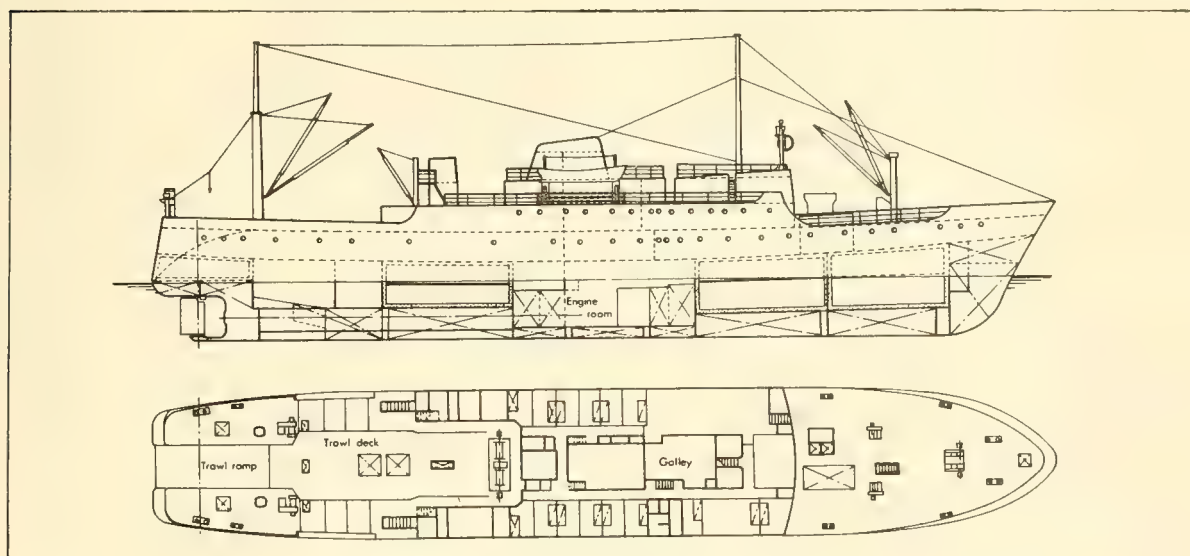


Fig. 1 - Profile and layout of modern Polish stern trawler.

Poland (Contd.):

Table 2 - Polish Fishing Enterprises, 1965

Types of Activity	Fishing Enterprises and Their Locations							
	Dalmor-- Gdynia	Odra-- Swinoujscie	Gryf-- Szczecin	Koga-- Hel	Korab-- Ustka	Kuter-- Darlowo	Barka-- Kolobrzeg	Szkuner-- Wladyslawowo
Deep-sea fishing	X	X	X					
Processing (on ship and shore)		X						
Initial processing only		X	X	X	X	X	X	X
Refrigeration	X						X	
Ice production	X	X						X
Fish meal production	X	X				X		X
Packaging	X	X						
Repair shops	X	X	X		X	X	X	X
"Siloryb" fish meal production	X	X	X	X	X	X	X	X
Netting and gear shop	X	X	X	X	X	X	X	X
Canning		X	X					
Cold storage	X	X			X			

Source: Zjednoczenie Godpodarki Rybnej, Warsaw, 1966.

Fig. 2 - Preparing herring for hot-smoking in a Polish fish canning plant in Gdynia.

and gear shops. All of them process fishery landings in some form, but only one enterprise has full-scale end-processing facilities (Dalmor of Gdynia), and only two enterprises have canning lines. Consumer packaging is done by only two enterprises, and only three have cold-storage facilities or manufacture ice. The fact that all major fish-processing plants (except the one in Gdynia) are located in cities other than fishery landing ports probably has an unfortunate effect on final production costs.

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OCEANOGRAPHIC RESEARCH VESSELS BEING BUILT FOR U.S.S.R.:

Polish shipyards at Szczecin will construct 9 oceanographic research vessels for the Main Institute of Hydrometeorology of the U.S.S.R. The construction will begin in 1967; at present Polish naval architects are working on the design of the prototype. (Zycie Gospodarcze, December 5, 1965.)

Editor's Note: The new Soviet class of oceanographic research vessels has these specifications: displacement of 3,550 tons, length exceeding 100 meters (328 feet), a crew of 105 (50 scientists and 55 crew members), sea endurance of 90 days. This class will be equipped with the latest electronic instruments and each vessel will have 23 laboratories as well as auxiliary installations and workshops. The vessels will have reinforced hulls and air-conditioning, enabling them thus to conduct research both in polar as well as in tropical marine regions. The range of studies will include hydrology, biology, chemistry, geography, acoustics, and other sciences.



Rumania

FISHERY LANDINGS IN 1965:

State-owned fishery enterprises landed 44,250 metric tons of fish in 1965 or 37 percent more than in 1964 when 32,404 tons (landed weight) were produced. (U. S. Embassy, Bucharest, February 18, 1966.)

Editor's Note: Until 1964, more than two-thirds of the yearly catch consisted of freshwater species; however, much of the 1965 increase of over 10,000 tons probably comes from high-seas fishing. Rumanians bought 2 large stern trawlers from Japan in 1964 and have been fishing off Africa's coast and in the Northwest Atlantic with good results.

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Rumania (Contd.):

ACCESSION TO TRIPARTITE FISHERIES COOPERATION AGREEMENT:

Rumania will accede to the tripartite agreement on fisheries cooperation concluded in July 1962 between the U.S.S.R., Poland, and East Germany. Bulgaria joined the agreement in 1964. Administered by a Joint Mixed Commission, the agreement stipulates a close collaboration between the signatory powers in marine fishery research, high-seas fishing operations, and fishery technology. The Commission also forecasts fishing stocks in the Northwest Atlantic and coordinates fishery research there.

**Ryukyu Islands****FISHERIES STUDIED BY U. S. EXPERT:**

A Honolulu-based expert in fisheries research was asked to assist in the development of Okinawan fisheries research activities. He made a short study in Okinawa in February 1966.

Lucian M. Sprague, Deputy Area Director for Hawaii, Bureau of Commercial Fisheries, U. S. Department of the Interior, made a 2-week visit to Naha, Okinawa, at the invitation of the Civil Administration of the Ryukyu Islands.

His mission was to evaluate and recommend improvements in the collection of tuna fishing statistics and the training of fishery technicians. The technicians, employed by the Ryukyuan municipalities, are responsible for introducing and demonstrating new and improved fishery techniques, collecting fishery statistics, and disseminating information to the local fishermen.

Sprague was drafting a set of recommendations as to how the collection of certain fishery statistics, which are the basis for scientific study of fisheries, can be modernized.

Fishing is big business in the Ryukyus. In addition to supplying the large local fresh-fish market, Okinawan vessels operate as far away as the Atlantic shore of Africa. The thriving tuna fisheries in the Trust Territory of the Pacific Islands also have attracted Okinawan vessels.

Sprague found that despite the apparent prosperity of the Okinawan fleet, it is facing a problem it shares with the Hawaiian fisheries--that of attracting young men to become fishermen. Hawaii's solution has been to establish a State-supported school in Hilo for training young men. In Okinawa, such training is available through a fishery high school.

**Senegal****ATLANTIC TUNA FISHERIES:**

The principal species of tuna landed in Dakar are the yellowfin, skipjack, and occasionally big-eyed ("Patudo"). Information on the location of principal and minor grounds by species is not available, but the general rule is that the percentage of skipjack increases moving north toward Dakar.

A breakdown of the location of catches by month during the 1964/65 tuna season follows:

November-December: Most catches are made from 15° N. to the Casamance and approximately 17.5° W. Also there were catches off the coast of Portuguese Guinea between 17° and 18° W.

January: Ice vessels made catches off Portuguese Guinea between 17° and 18° W., and freezing boats off Sierra Leone from 14.5° to 15.5° W.

February: Several catches were made around Dakar, between latitudes of 13.5° and 14° and south as far as the southern border of Portuguese Guinea. All catches were between 17° and 18° W.

March-April: Ice vessel catches were from 10.5° to 12.5° N. and between 17° and 18° W. Grounds for freezing vessels were between 7.5° and 9.5° N. and from 14.5° to 16.5° W. with concentrations from 8.5° to 9° N. and 15.5° to 16° W.

May: There were only a few scattered catches in May.

June: A few catches took place between Dakar and St. Louis and a few off the coast of Sierra Leone 15° W.

A few vessels were fishing north of Dakar during the summer months and results were

Senegal (Contd.):

encouraging. This year there seems to be increased fishing in the area of the Cape Verde Islands.

With the exception of 1 or 2 purse seiners that on occasion land at Dakar, all of the tuna vessels use live bait and poles.

In January 1966 there were 32 small ice vessels landing their fish in Dakar although more are expected later in the season. SOSAP (Societe Senegalaise d'Armement et de Peche), the Senegalese Government-owned tuna fishing company, is operating 3 of the 5 freezing vessels of 26 meters (85 feet) built with a French loan. The last 2 were expected shortly. The British Government has recently requested tenders on the 4 tuna vessels they will sell to SOSAP on a long-term loan. (As part of a Soviet-financed tuna complex, there is provision for 15 ice vessels. An agreement of principle was signed with the Soviets in March 1965, but the technical problems have not been resolved and discussions are taking place.)

At one time there had been 7 canneries in Senegal. But, now there are 3 French-owned canneries in operation: 2 in Dakar and 1 in Rufisque, and they have been discussing possibilities of further consolidation. Their total capacity is 120 metric tons a day with 15 percent skipjack. A cannery with a yearly capacity of 15,000 to 20,000 tons is planned as part of the Soviet-financed complex mentioned.

The Dakar ORSTOM (Office de la Recherche Scientifique et Technique Outre-Mer) laboratory, in conjunction with ORSTOM installations in Abidjan and Pointe Noire, is studying population dynamics of the Atlantic tuna. For the last few months ORSTOM has been obtaining catch information but the lack of an oceanographic vessel has prevented extensive research. (United States Embassy, Dakar, January 25, 1966.)



South Africa

GOOD 1966 FISHING SEASON FORECAST:

Bright prospects were forecast for the South African fishing industry for 1966 by the chairman of the South African Fishmeal, Fish Canners and Fish Oil Producer Associations.

Fish Meal: Prices reached a very high level during October and November 1965, but with heavy production in Peru during December and January, prices leveled off; however, the market remained firm in March 1966.

The South African industry was not selling as of that date until it could be established more accurately what the production would be. About 60 percent of the estimated production of fish meal for the year has been sold. A good portion of this has been sold on the high market. The fish meal has been sold to the traditional markets in Europe and the United States.

Fish Oil: The entire 1966 production has been sold to the United Kingdom at about the same price as last year.

The first shipment of oil will be made from Walvis Bay about April 1966.

Canned Fish: Sales were to regular markets with the local market in South Africa showing an increase of about 100 percent over the past few years.

A new market for canned goods is Japan which is taking 150,000 cases in the traditional soya pack. "With fish becoming scarce in their traditional fishing grounds I feel that this will become an important market in the future. We hope to develop this market considerably," the chairman said.

Spiny Lobster: The United States market was very stable and the industry was having no difficulty in disposing of its quota. Mount Vema had come to an end, the last boats returning empty.

The chairman said he saw no difficulty in the factories meeting their quotas this year. After a bad start the fishing in the Republic was improving. (Namib Times, Cape Town, March 4, 1966.)

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NEW SPINY LOBSTER PLANT:

A wholly-owned South African company (with French principals and offices in Durban and Cape Town) is behind a move to fish the rich spiny lobster or crayfish grounds in the Indian Ocean off the South African coast, operating from Durban.

Two of the principals behind the enterprise were in Durban to organize the venture follow-

South Africa (Contd.):

ing the arrival of their first vessel from Brit-tany, the La Barade, in early March 1966.

A second vessel, the Frai-Lann, was due in Durban. One of the men said that additional vessels would be employed if the venture warranted them.

The company holds a quota of 10,000 car-tons of spiny lobster for export to Europe. (Namib Times, Cape Town, March 4, 1966.)

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NEW STERN TRAWLER WITH SHELTER DECK:

The Dunblane, the third of a series of 75-ft. stern trawlers to be built for a major South African fishing company, incorporates a num-ber of design changes adopted in the light of experience with the earlier vessels Scotia and Dunscore which have been fishing suc-cessfully in waters off the Cape of Good Hope.

Most striking of the innovations, which also reflect an extensive survey of overseas de-sign trends, is the adoption of an extended shelter deck which provides considerably more uncluttered working and storage space and a generous measure of weather protection for the crew.

The net roll is mounted above the after-deck on a higher-than-usual gantry, arranged to align with the transom, and this is designed to simplify the job of hoisting the cod end aboard and over the fish bins.

A multipurpose vessel, designed to trawl for white fish out of Port Nolloth or to fish for spiny or rock lobster at Vema ridge, the Dunblane arrived in Cape Town in December 1965 on her delivery voyage. Although it has no refrigeration, the fish hold is insulated with polyurethane foam and the engineroom provides ample space for the installation of a freezing plant. The hold capacity of 3,000 cubic feet is sufficient for about 25 metric tons of fish, and 7 dinghies (handled by two derricks) are carried.

Four similar vessels are either already in service or under construction. One is fish-ing for shrimp off the Mozambique coast.

The Dunblane has a gross tonnage frac-tionally less than 100--which means that she

is exempt from the provisions of the South African Merchant Shipping Act which require all craft of this size and over to be manned by a certificated master, first mate, and en-gineer. Her four-cylinder diesel engine, driving a variable pitch propeller, develops 280 hp. at 340 r.p.m. and gives the vessel a speed of 10 knots. Her fuel tanks have a capacity of 5,810 imperial gallons.

The two derricks are mounted on the shel-ter deck to handle the dinghies used in lob-ster fishing. The use of a high-pressure hydraulic system for this work gives high-speed operation so that the dinghies can be hoisted aboard with a minimum of delay if bad weather should blow up without warning.

With accommodations for a total of 24, the Dunblane is compactly designed for max-imum space utilization. Her draft of 8 feet will allow her to operate from across the Port Nolloth bar and she has a beam of 21 ft. and a moulded depth of 10 ft. 6 in.

The shelter deck extends from abaft the bridge and brings the trawl winch, which is mounted there, into convenient proximity with the remote engine controls and other fishing gear. Bridge equipment includes a transis-torized echo-sounder, a fish-finder with black and white lines, a radiotelephone, and radar.

On trials off Durban the Dunblane dis-played remarkable maneuverability by making complete turns, both to starboard and to port, in a circle of only 100-ft. diameter. From full ahead, she was brought to a "crash stop" in 100 ft. Hard a'port to hard a'starboard was achieved in 20 seconds. (The South Afri-can Shipping News and Fishing Industry Re-view, January 1966.)



South-West Africa

BOOM CREATED BY FISHING INDUSTRY:

The port of Walvis Bay in South-West Af-rica is experiencing a boom due in large part to various fishing industry developments.

Big developments are being planned in the white fish industry. The Walvis Bay Town Council made several sites with sea frontage available for the construction of fish-proc-essing and storing factories and one concern

South-West Africa (Contd.):

is believed to be planning to invest over US\$4 million in the white fish industry there.

This is being done against the background of no less than 120 vessels of ten foreign countries trawling off the South-West African coast. Using modern fish-finding and processing equipment and the latest trawlers, the main catch is hake. This is cleaned and frozen and then transshipped to reefer vessels for shipment back to the home country.

Next year will see an even bigger buildup of foreign trawlers off the South-West Africa coast. (South African Shipping News and Fishing Industry Review, January 1966.)

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COMMISSION TO STUDY STATUS OF FISHING INDUSTRY:

A 3-man Commission of Inquiry has been appointed by the South-West Africa Administration to study the fishing industry. The Commission was expected to start work in February 1966 to inquire into, report, and make recommendations on the systematic, intentional, and effective exploitation of and control over the fish potential of South-West Africa, with regard to the current quotas already granted to industrialists.

It was also to examine the desirability of increasing or reducing the quotas and of granting one or more new licenses either in Walvis Bay or elsewhere along the South-West African coast. Its scope includes incidental matters relating to controlled fish, including spiny or rock lobster and white fish.

The 8 fish meal factories in South-West Africa each have a quota of 90,000 metric tons of pilchards. It has been reported that the Government may grant each plant an interim quota increase of 10,000 tons, bringing the total quota to a record 800,000 tons.

(South African Shipping News and Fishing Industry Review, January 1966, and Namib Times, February 4, 1966.)



Taiwan

SMALL INCREASE IN 1965 FISHERY LANDINGS:

Catch: The fishery production of Taiwan in 1965 of 381,688 metric tons was 1.4 per cent over the 376,398 tons in 1964.

The only increase was in the deep-sea fisheries and was due mainly to the increase in the number of bull trawlers and their comparatively good average catch. Outer coastal fisheries suffered the first setback since 1948. This may be due to abnormal water temperatures, which resulted in scarcity of such important species as the sardines, bonito, and horse mackerel.

Taiwan's Fishery Production, 1964-1965			
	1965	1964	Increase or Decrease from 1964
	. (Metric Tons) (%)
Deep sea	135,949	126,765	+7.2
Coastal, outer . .	160,924	161,151	-0.1
Coastal, inner . .	30,655	32,191	-4.8
Fish culture . . .	54,160	56,291	-3.8
Total	381,688	376,398	+1.4

More Tuna Long-Liners in Operation:

By January 1966, the last of the 16 tuna long-liners constructed with a loan from the World Bank had left Taiwan to fish in the Indian Ocean. Of the ten 120-ton tuna boats constructed with a loan from the Joint Commission on Rural Reconstruction, two were completed in December 1965 and are now fishing off Mauritius Island in the Indian Ocean.

Outstanding Results Obtained in Fish Pond Fertilization:

By the application of superphosphate in fresh-water fish ponds in which the silver carp (*Hypophthalmichthys molitrix*) was the dominant species, the fish culturist of the Joint Commission on Rural Reconstruction was able to increase the production of fish from 2 to 4 times as compared to ponds using organic manure. This was possible because the silver carp is exclusively a phytoplankton feeder and phosphate increases the production of phytoplankton. (T. P. Chen, Joint Commission on Rural Reconstruction, Taipei, Taiwan.)

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SEEKING FURTHER JAPANESE COOPERATION IN FISHERIES:

Both Government and private circles in Taiwan plan to expand pelagic tuna fisheries and to enter the trawler fisheries. They are working on Japanese circles concerned, with the intention to tie-up with Japanese trading firms and fisheries companies in fishing operations and marketing of products.

Taiwan lays special emphasis on tuna in its efforts for the development of the fisheries. It embarked on fishing operations based

Taiwan (Contd.):

at American Samoa in the Pacific in 1964 and has been endeavoring to expand its pelagic tuna-fishing fleet, mainly for the purpose of increasing its tuna exports to the United States. In 1965, it built 13 tuna-fishing vessels of 357 gross tons in Japan with a loan from the World Bank, and extended its fishing activity to the Indian Ocean. It is determined to develop its fisheries further, and the Government of Taiwan has received another loan from the World Bank of about US\$10 million, for the development of fisheries. This loan will be used to build 12 tuna-fishing vessels of 250 gross tons and 4 trawlers of 1,500 gross tons. In addition, used tuna-fishing vessels up to a limit of 4,500 gross tons total will be purchased from Japan in the next year.

These plans will increase considerably Taiwan's tuna fisheries in the Pacific and Indian Oceans. The Government of Taiwan has taken the following steps to aid its tuna fisheries: (1) to permit free fishing so that the production costs of private fisheries enterprises will not increase due to exclusive fisheries rights; (2) to exempt fisheries enterprises from income tax for five years after their establishment. Besides, it is said that the wage level in Taiwan is only one-fifth of that in Japan. Taking these factors into consideration, it was estimated that the production cost of tuna fisheries in Taiwan is about 20 percent lower than that in Japan. Taiwan's decision to embark on pelagic trawler fisheries, together with Korea's plan for entry into this field, will endanger Japan's pelagic fisheries because of limited resources.

In the case of Taiwan, obstacles to the building of self-supporting overseas fisheries are the lack of overseas fishing bases (equipped with cold-storage, materials-supply, and marketing facilities) and the weak export structure. Because of these faults, Taiwan must rely on the fisheries enterprises of Japan, which is more advanced as a fisheries nation, for the use of bases and the conduct of marketing. Heretofore, the tuna-fishing vessels of the fisheries enterprises of Taiwan, have been operating in the Pacific and the Indian Oceans in tie-ups with Japanese trading and fisheries firms based in Samoa, Durban, South Africa, and Penang, Malaysia, in such forms as joint use of bases and commission sales.

The Taiwan side is working with these Japanese firms to increase their joint opera-

tions. Some Japanese trading and fisheries firms expect that tie-up with the fisheries enterprises of Taiwan, whose production cost is low, will bring considerable benefits, in view of the worldwide shortage of tuna and the rise in the export prices of tuna. They are planning to send their officials to Taipei for negotiations with the Taiwan side. Among the Japanese trading firms, however, there are those which have business connections with Communist China. They fear that cooperation with Taiwan will adversely affect their future relations with Communist China. Also it is feared that cooperation with Taiwan, which will help the growth of Taiwan's fisheries, may eventually drive Japanese fisheries into greater difficulties. So the Japan Federation of Bonito and Tuna Fisheries Co-operative Unions was scheduled to hold a meeting of its Policy Committee to study measures to counter the development of Taiwan's fisheries and to consider the advantages and disadvantages of cooperation with fisheries enterprises of Taiwan. (Nihon Keizai, March 17, 1966.)



Thailand

FISHERIES LEGISLATION FAVORS DOMESTIC FISHERMEN:

Thai legislation on fisheries indicates the Government's desire to reserve the fishing industry, including the ownership and operation of fishing vessels, for the exploitation of its citizens. Most enterprises fishing in Thai waters or delivering their catches to Thai ports will have to be joint-venture enterprises or may have to be operated under a contract with Thai owners of fishing vessels. (United States Embassy, Bangkok, December 15, 1965.)



Trinidad

FOREIGN VESSEL ACTIVITY:

In March 1966, about 18 U. S. shrimp trawlers were operating out of Port-of-Spain, Trinidad, and a local shrimp-processing plant had begun operations. Additional U. S. shrimp trawlers were expected to arrive. Meanwhile, use of Trinidad as a transshipping base by the Japanese tuna fleet had decreased substantially as a result of declining

Trinidad (Contd.):



tuna catches. (United States Embassy, Port-of-Spain, March 8, 1966.)



U.S.S.R.

EXPORTS OF FISHERY PRODUCTS TO WESTERN NATIONS:

In 1964, the free-world imports of edible fish and shellfish preparations from Sino-Soviet Bloc countries amounted to \$67.1 million, or about 65 percent more than in 1963 when such imports amounted to \$42.0 million (not included are fish meal, fish oils, whale products, and other nonedible fishery products). As in previous years, Communist China was the largest single exporter of edible fishery products to free-world countries (\$37.7 million in 1964 and \$21.0 million in 1963), followed by the Soviet Union (\$23.7 million in 1964 and \$16.3 million in 1963). Among other Sino-Soviet Bloc countries, Poland exported in 1964 \$3.0 million and North Korea \$0.8 million; exports from the remaining countries were negligible.

PROMOTION OF EXPORTS TO WEST EUROPE:

Soviet Ministries of Fisheries and Foreign Trade will jointly organize a promotional campaign in Western Europe in March and April 1966. A 3,500-gross-ton refrigerated fish transport, the *Svetlii*, will be placed at the disposition of the organizers and will be equipped with exhibits and samples of Soviet fishery products. Preliminary plans provide for stops in the Netherlands, Belgium, Federal Republic of Germany, United Kingdom, France, Italy, and Greece. This is the first time the Soviets have organized a fishery

promotion campaign in Western Europe or elsewhere. Both the European and the Far Eastern Fishery Administrations will participate in the campaign with their specialized products.

ESTABLISHMENT OF FOREIGN TRADE SECTIONS:

Foreign trade sections are being organized in the five Soviet Regional Fishery Administrations. In 1965, the Western Fisheries Administration organized such a section at Kaliningrad and the result was greatly expanded fishery exports to African countries. Nigeria, which in 1963 and 1964 bought 3,100 and 9,700 metric tons, respectively, of fishery products from the Soviet Union, plans to increase such imports to 36,000 tons in 1966 (data for 1965 not yet available). A Foreign Trade Department was also organized at Vladivostok in 1964 to promote fishery exports to Japan and other nearby Asian countries.

FISHERY EXPORTS TO THE U. S. DOUBLE IN 1965:

In 1965, exports of Soviet fishery products to the United States amounted to \$505,000 (see table) or more than double the value of 1964 exports of \$215,000. Despite this

U. S. Imports of Soviet Fishery Products, 1964-65 ^{1/}

Product	1965			1964
	Value	Quantity	Average Price Per Lb.	Value
	US\$	Lbs.	US¢	US\$
Lobsters	183,270	250,520	73.2	-
Scallops	157,279	647,164	24.3	141,467
Cod blocks	55,980	283,500	19.7	-
Crabmeat, canned ...	52,860	53,762	98.3	35,898
Sturgeon roe	43,575	6,683	65.2	30,279
Shrimp	9,964	33,085	30.1	-
Fish, canned	1,714	2,831	60.5	2,260
Salmon, frsh. or froz.	644	2,258	29.4	-
Other	-	-	-	4,799
Total	505,286	1,279,803	39.5	214,703

^{1/}Preliminary data supplied by the Branch of Statistics, Bureau of Commercial Fisheries, U. S. Department of the Interior.

increase, U.S.S.R. products represent only a small part of total U. S. imports, which in 1964 exceeded \$490 million. Lobsters imported from the U.S.S.R. for the first time in recent years, were the largest item by value (\$183,000) and scallops by quantity (647,164 lbs.). Cod blocks (\$56,000) and shrimp (\$10,000) were also imported by the United States for the first time from the Soviet Union. The remaining Soviet exports (canned king crab, sturgeon roe, canned salmon) are

U.S.S.R. (Contd.):

traditional United States fishery imports from the U.S.S.R.

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PRODUCTION OF CANNED KING CRAB FROM EASTERN BERING SEA:

Soviet king crab catches in the eastern Bering Sea decreased considerably in 1965 after the U. S.-U.S.S.R. agreement on king crab fishing in early 1965. In 1964, the Soviets fished in the eastern Bering Sea from April-July using 3 king crab factoryship fleets consisting of 9 net-setting medium trawlers and 33 pick-up boats. With this fleet

trawlers operated early in 1966 between Shumagin and Kodiak Islands.

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EXPLOITATION OF ALASKA POLLOCK INCREASED:

Soviets sell Alaska pollock to the Japanese on the fishing grounds in the Sea of Okhotsk. Over 100 Soviet seiners and trawlers from the Kamchatka, Sakhalin, and Primorskii Krai Regional Fishery Administrations participated in early February 1966 in that pollock fishery.

In 1964, the U.S.S.R. reported landings of 213,600 metric tons of pollock. In 1966, the

Soviet Fishing for King Crab in the Eastern Bering Sea (Bristol Bay), 1959-1965

Year	Months Fished	Number of Vessels				Tangle Nets Set 3/	Average Time for Set	Male King Crabs	Canned Pack
		Factoryships	SRT Medium Trawlers 1/	Motor Boats 2/	Total				
1965	April-June	3	9	33	45	618,689	132.5	2,225,567	45,010
1964	April-July	3	9	33	45	607,459	136.6	2,799,620	72,104
1963	April-July	3	6	33	42	536,139	162.1	3,019,417	76,369
1962	April-July	2	6	22	30	419,667	110.5	3,019,211	72,160
1961	April-July	2	6	21	29	387,976	128.1	3,441,314	73,154
1960	April-July	1	3	10	14	191,559	94.0	1,995,006	37,722
1959	July-Sept.	1	-	8	9	63,950	95.0	620,406	7,961
Total						2,825,439		17,120,541	384,480

1/Crew of 22, of which 10 are king crab fishermen.

2/Crew of 12, of which 10 are king crab fishermen.

3/In units; length of unit not specified.

Source: Ministry of Fisheries, U.S.S.R.

of 45 king crab fishing vessels, the Soviets landed 2.8 million male crabs and produced about 72,100 cases (96 8-oz. cans) of canned crab. In 1965, the same number of vessels operating from April to June caught 2.2 million crabs but produced only about 45,000 cases, a decrease of 37.6 percent and an indication that smaller crabs were landed.

Editor's Note: In 1965, the Soviets ended crab fishing in the eastern Bering Sea 1 month earlier than in previous years, probably to fish in other parts of the Bering Sea for saury, pollock, and other species. Despite the effort, the Soviet Far Eastern crab fleet failed to meet its yearly production quota in 1965, although it did fulfill its 7-year plan (1959-1965).

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BERING SEA SHRIMP CATCH PLANS, 1966:

The Soviet 1966 catch quota for Bering Sea shrimp was set at 6,000 metric tons (13.2 million pounds). Most of it will be taken off Alaska where about 10 Soviet medium freezer

Soviets plan to catch over 300,000 tons by late spring when fishing will be discontinued. In addition to direct deliveries (47,500 metric tons in 1966) to a Japanese fish-meal factory-ship, Soviets export pollock to other Asian countries.

Most of the Soviet domestic pollock landings are reduced into fish meal, but vitaminized medicinal fish oil is also produced.

In March 1966, the U.S.S.R. sold 5,000 metric tons of frozen whole pollock to a Finnish importer for fur-animal feeding. The price was 4.6 U. S. cents a pound c.i.f. Finnish border; fish were shipped to Finland by rail from Vladivostok.

Note: See Commercial Fisheries Review, March 1966 p. 58.

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MEAT PRODUCTION GOAL LAGS BEHIND THAT OF FISHERY PRODUCTS:

Soviet fisheries production for the 7-Year Plan (1959-1965) has surpassed all expectations while Soviet meat production lags be-

U.S.S.R. (Contd.):

U.S.S.R.'s Planned and Actual Landings of Fish, Shellfish, and Marine Mammals, 1950 and 1959-1965				
Year	Planned Production		Actual Production	
	Quantity	Increase Over Previous Calendar Year	Quantity	Increase or Decrease Over Previous Calendar Year
	Metric Tons	%	Metric Tons	%
1965	5,600	14.3	5,650	+10.0
1964	4,900	16.1	5,121	+ 9.6
1963	4,220	7.2	4,670	+12.1
1962	3,937	6.4	4,167	+11.9
1961	3,700	9.5	3,724	+ 5.2
1960	3,380	1/	3,541	+15.2
1959	1/	1/	3,075	+ 4.7
1950	1/	1/	1,755	-10.1

1/Not available.

hind original goals. In 1959, the U.S.S.R. goal for 1965 was a catch of 4.6 million metric tons (live weight) of fish, shellfish, marine mammals, and other aquatic products; the actual production in 1965 was 5.6 million tons, or 22 percent more than expected. In 1959, the Plan's goal was 16 million metric tons of meat output (slaughter weight) by 1965; the actual production of meat in 1965 was only 9.6 million tons, or 40 percent less than expected. This points up the reliance the Soviets are putting on food from the sea to provide the country's protein needs.

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FISHING OFF GREENLAND TO EXPAND:

Soviets plan to expand fishing off west and east Greenland in 1966. Analysis of Soviet explorations show large concentrations of fish in that area. Most of the exploratory fishing was conducted by PINRO (Polar Institute of Marine Fisheries and Oceanography) scientists from Murmansk. It is believed that a majority of fishing vessels operating in the new fishing area will come from the Northern Fisheries Administration, Murmansk.

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PURSE SEINE FOR HERRING IN NORTH ATLANTIC:

The Soviet large stern trawler Aist, using a special hydro-locator, has been fishing North Atlantic herring with a purse seine 650 meters (2,132 feet) long and 130 meters (426 feet) deep. In three months (latter part of 1965 and early 1966), the Aist set the seine 41 times and landed 550 metric tons of herring, or an average of about 13 tons per haul. To speed up the setting and hauling of the net, lead weights and detachable bronze rings were added to it. The Soviets estimate that

the adoption of purse seines in their herring fishery might save them 60 percent in gear costs and at the same time increase landings. (World Fishing, February 1966.)

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HAKE FISHING IN EASTERN PACIFIC:

The Soviets have begun hake fishing in the Eastern Pacific with an undetermined number of vessels. Large concentrations of Pacific hake were discovered by Soviet exploratory vessels in the eastern part of the Pacific; the date of discovery was not specified, but was probably in early 1966. Meanwhile, several Soviet vessels reportedly fished hake in the "Eastern Pacific" in February 1966. Official Soviet catch plans for 1966 provide for at least 30,000 metric tons (65 million pounds) of hake.

The Soviet Union had in the first quarter of 1966, three major research expeditions in the Pacific, each consisting of 5-6 research vessels. Two of the research fleets are operating in the eastern Pacific; one near the Gulf of California (off Mexico), the other in an undetermined location off South America. The third one was conducting research off Australia's southern coast and in the Indian Ocean.

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RESEARCH IN THE INDIAN OCEAN:

The Soviet fishery research vessel Akademik Knipovich called at the port of Rangoon, Burma, in February 1966. The ship is on a research cruise in the Indian Ocean. A party of 30 scientists headed by Prof. A. S. Bogdanov, the Director of the Federal Scientific Research Institute for Fisheries and Oceanography (VNIRO), is conducting fishery and oceanographic research in the area. At Rangoon, four Burmese scientists joined the Soviet scientific party for a 10-day joint study of fishery resources in waters off Burma's coast.

Editor's Note: The visit of the Soviet research vessel coincided with the opening of the U.S.S.R. Trade and Industrial Exhibition, which opened in Rangoon in March 1966 and which represents a combined propaganda and trade promotion effort by the U.S.S.R.

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U.S.S.R. (Contd.):

CULTURES SHRIMP SUCCESSFULLY:

The Soviet Institute of Marine Fisheries and Oceanography (VNIRO) is cultivating shrimp in the water reservoirs of peat-fired power stations. Previous attempts to breed fresh-water Far Eastern shrimp in reservoirs failed. The problem was solved when shrimp were accidentally introduced into the reservoir of a power station together with fish fry. The even temperature of 35° C. (95° F.), and the soft-peat water provided an excellent medium in which shrimp could breed. In a few years, the number of shrimp has reached several hundred thousand in one reservoir alone. (World Fishing, February 1966.)

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SHARK FISHERY:

Soviets fish for sharks in the Sea of Japan, exporting shark fins to Japan and producing fish meal and fish oil from shark meat for domestic markets. The shark fishery is a relatively new enterprise for Soviet fishermen; in 1964 they caught only 100 metric tons of sharks. The shark fishery is organized by the Far Eastern Fishery Administration with headquarters at Vladivostok.

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NEW LAW BANS DOLPHIN HUNTING:

The Soviet Union has a new law that bans commercial hunting of dolphins, which in the

U.S.S.R. is practiced mainly in the Black Sea. The Soviet Fisheries Minister in announcing the new conservation measures, stated that they were necessary because of the increasing importance of dolphins for scientific research and proposed that other dolphin-hunting nations institute similar bans. (United States Embassy, Moscow, March 15, 1966.)

Editor's Note: According to FAO statistics, the total reported world harvest of dolphins in 1963 did not exceed 1,000 metric tons. Turkey was the major dolphin-hunting nation that year (400 tons).

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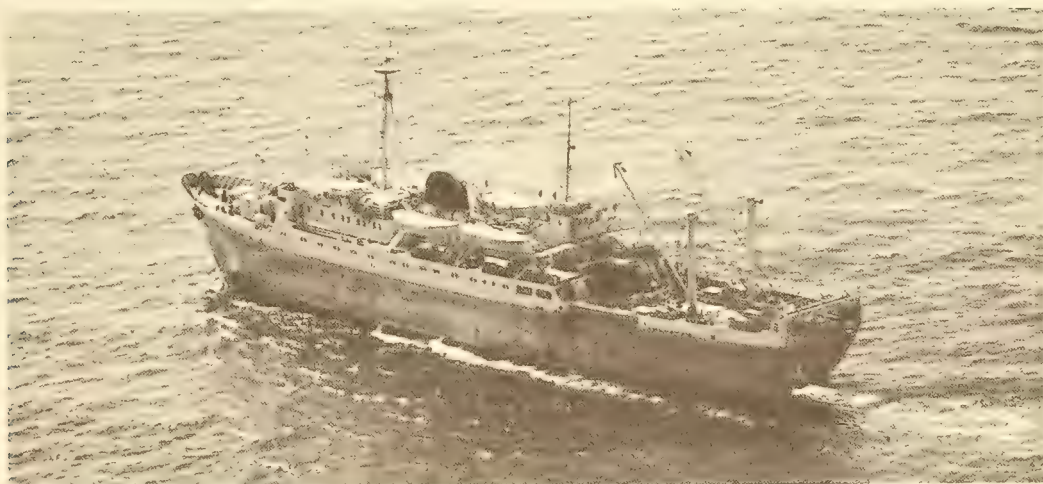
OCEANOGRAPHIC RESEARCH IN THE CARIBBEAN SEA:

In March 1966, the oceanographic research vessel Iu. M. Shokalskii conducted oceanographic and fishery studies in the Caribbean. In 1965, the same vessel, along with Uliana Gromova and Zhemchug, participated in the Soviet studies of the Kuroshio Current, headed by Prof. A. Muromtsev and sponsored by the Intergovernmental Oceanographic Commission.

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PACIFIC FISHING FLEET INCREASING:

In March 1966, the Soviet Far Eastern Fisheries Administration acquired the 35th large stern trawler (named Seroglazka).



Soviet large stern trawler Pechenga (BMRT-364), belonging to the Maiakovskii class of stern trawlers, fishes ocean perch in the North Pacific. Maiakovskii-class stern trawlers have a cruising range of 17,000 miles and can stay at sea 80 days. The vessels are about 3,200 gross tons and operate with a crew of 90-100. These trawlers are good producers: in 1964, one of them (Nikolai Ostrovskii) landed over 15,000 metric tons of fish and established a Soviet record for this type of vessel. As a result, the captain was appointed delegate to the 23rd Congress of the Soviet Communist Party held in Moscow in March-April 1966.

U.S.S.R. (Contd.):

This is remarkable progress when one recalls that in 1959 the U.S.S.R. had only 1 large stern trawler operating in the Pacific Ocean and the Bering Sea. During 1960-1963 a total of over 20 Maiakovskii-class stern trawlers were added; most of the 1964-65 additions belonged to the same class. The rate of yearly additions has increased since 1960 and will continue to do so until at least 1970; by then the Soviet Union plans to add several dozen new BMRT's to its Pacific fishing fleet and increase fishery landings to 3.2 million metric tons.

Editor's Note: In 1965, Soviet fishery landings from the Far East (including Antarctic whale catches) amounted to 1,970,000 metric tons.

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REFRIGERATOR FLEET:

Soviet Far Eastern Fisheries Administration revealed that a total of about 100 refrigerated fish carriers and other fish transports were in service as of January 1, 1966, in the Pacific Ocean and Bering Sea. In January 1959 less than 50 fish transports were available in the Far East. The total number of Soviet fishing carriers at the end of 1964 exceeded 300 units.

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FAR EAST FISHING FLEET
RECEIVES NEW VESSELS:

The Soviet fishing fleet in the Far East early in 1966 obtained two large new vessels: one, the refrigerated fish carrier Vologda (6,500 gross tons) was built in Soviet shipyards; the other, the Spassk (18,000 gross tons) was purchased in Japan for a reported US\$7.5 million. The Spassk is the first of eight fish factoryships ordered by the Soviets in Japan for a total price of US\$60.4 million and the following payment terms: 30 percent down, the balance payable in semiannual installments over 5½ years at an interest of 4 percent per annum.

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NEW REPAIR SHIPYARD AT KLAJPEDA:

The Soviet Government has approved plans for the construction of a large fishing vessel repair shipyard at Klaipeda (Lithuania) on the Baltic. More than 10,000 workers will be

employed. Six floating drydocks (the largest with a capacity of 27,000 displacement tons) will make possible the overhaul and repairs of up to 120 large stern factory trawlers, fishing bases, and processing refrigerator vessels per year. Klaipeda was selected because the sea there does not freeze in the winter and because of its proximity to the Atlantic, where most of the vessels from the Western (Baltic) Fisheries Administration will fish. The construction of the repair shipyard reportedly will start in 1967 and should be finished by the end of the 5-Year Plan in 1970.

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FINNISH FISHING BASES
ON SOVIET ISLANDS:

An agreement has been reached between the Soviet Union and the Finnish Seaman's Union on the establishment of two bunkering and supply depots for the Finnish fishing fleet on two Soviet Islands in the Baltic Sea. It is believed that two Estonian Islands (Hii-uma and Saaremaa) are the sites of the new bases. (United States Embassy, Helsinki, February 26, 1966.)



United Arab Republic

FISHERY PLANS, 1966-1970:

United Arab Republic (U.A.R.) will enter high-seas fishing, the Deputy Premier told the U.A.R. National Assembly in a speech on February 12, 1966. The second 5-Year Plan (1966-1970) includes, in addition to projects for developing inland fisheries, building new harbors for the marine fishing fleet and forming 10 cooperative fishermen's associations to promote the marketing of fishery products. Also includes the purchase of high-seas fishing vessels from the Soviet Union. A mission of experts was sent to the Soviet Union to effect the purchases. The type of vessels to be purchased was not announced; it is likely they will be large stern trawlers which the U. S. S. R. recently began exporting to Greece.



United Kingdom

MAY JOIN OTHER COUNTRIES IN FISHING SOUTH AFRICAN HAKE:

Britain's interest in the South African hake fishery was given new emphasis by the British White Fish Authority (WFA) in late February 1966. WFA reported it was working with South African scientists to assess the long-term prospects of the southern groundfish resource. WFA said: "... it is essential to look for alternative stocks for British vessels" Britain fears its traditional fishing grounds may be depleted by foreign fleets. Ironically, South Africa has exactly the same fears about its fishery resources and has declared a 12-mile fishing limit.

In late 1965, about 100 foreign fishing vessels were fishing groundfish off South Africa. Spain and the U. S. S. R. each had about 40 vessels there and at least 8 other countries had vessels in the area. The foreign vessels were fishing fairly close to shore, but beyond South Africa's declared 12-mile fishing limits. In an editorial proposing international regulation of the southern groundfish resource, Fishing News International said: "While these are still the early, turbulent days of long-range fishing, they are already showing that reluctant 'hosts' will get nowhere by standing on the cliff tops and shouting at the factoryships and freezer trawlers on the horizon." (Various sources.)



Venezuela

NEW RESEARCH VESSEL "LA SALLE" DELIVERED FROM NORWAY:

The 130-foot oceanographic and fisheries research vessel La Salle was delivered in late 1965 by a Norwegian shipyard to the La Salle Foundation of Natural Sciences in Caracas, Venezuela.

The vessel is equipped with laboratories for marine biology and oceanography. The laboratories are specially insulated against sound and vibration. The vessel carries 20 Nansen bottles, electronic fish-detecting and charting equipment, hydraulic winches for scientific instruments, and gear for both stern trawling, purse-seining, and long-line fishing. Facilities for holding fish alive, a freezing room of 700 cubic feet, and a re-

frigerated fish hold of 5,100 cubic feet, are also provided on the vessel.

Specifications of the La Salle are length 130 feet, breadth 31 feet, depth 13½ feet, deadweight about 300 tons, and main diesel engine 800 brake horsepower giving a cruising speed of 11.5 knots. The vessel has accommodations for 20 men.



New Venezuelan fisheries research vessel La Salle.

During the first 6 months of operation, the La Salle will have a complete Norwegian crew, and the Norwegian officers will stay on board for a year.

The cost of the vessel was about US\$550,000. (The Export Council of Norway, December 1965.)



Yugoslavia

FISH MEAL IMPORTS:

In the first half of 1965, Yugoslavia imported over 17,000 metric tons of fish meal, almost all of it from Peru. (U. S. Embassy, Belgrade, March 1966.) Comparative data for Yugoslavian fish imports in 1963 and 1964 are given in the table below:

Yugoslavian Fish Meal Imports, by Country of Origin			
Country	First Half of 1965	1964	1963
	(Metric Tons)		
United States	0	0	4,000
Peru	17,019	33,769	19,307
Italy	16	0	0
Total	17,035	33,769	23,387



Foreign Fishing Off United States Coasts, March 1966

OFF ALASKA:

Soviet: The number of Soviet fishing vessels off Alaska increased slightly during March. Early in April about 200 Soviet vessels were fishing off Alaska as compared to about 150 vessels in early March. This is about the same as last year at that time.

The Gulf of Alaska remained the center of Soviet fishing efforts with well over 100 medium and large trawlers and support vessels in the Pacific ocean perch fishery.

During March, two ocean perch fleets of about 35 vessels each operated on the Portlock Bank (east of Kodiak Island) and on the Continental Shelf off Yakutat. A third fleet of about 30 vessels was dispersed along the 100-fathom curve from Cape Spencer to Dixon Entrance (off southern Central Alaska).



Fig. 1 - A Soviet trawler fishing in the Bering Sea.

Towards the end of March there was a shift away from the Yakutat grounds: some vessels joined the Portlock Bank fleet; others went north for the Bristol Bay flounder fishery. In early April no more than 20 vessels remained off Yakutat. During the first 3 months of 1966, the Soviet fishing fleets caught over 30,000 metric tons of Pacific ocean perch in the Gulf of Alaska.

The Soviet shrimp fleet in the Gulf of Alaska consisted of 14 medium refrigerated trawlers (class SRTM) operating on the shrimp grounds near Shumagin Islands. The fleet was supported by one refrigerated carrier. During the first three months of 1966, this fleet caught over 4,000 metric tons of

shrimp, 30 percent above the January-March production quota. If the Soviets continue fishing for shrimp with such good results, they will soon exceed their 6,000-ton quota for 1966.



Fig. 2 - Soviet medium trawler alongside refrigerated vessel in eastern Bering Sea. Note deck arrangement and fishing gear on trawler.

The flounder fishery this year began in late February when the Soviets shifted their herring fishing effort in the Central Bering Sea to the flounder fishery because their exploratory vessels were unable to locate sufficient herring. By early March about 30-40 vessels fished for flounder north of the Unimak Island on the Continental Shelf in 40-50 fathoms. By early April, this fleet doubled and reported good catches. Flounder is frozen and taken back to the Siberian Mainland, where half is sold as landed and the other half canned.

At least three large crab factory vessels departed Vladivostok the last week of March. This indicated that Soviet king crab fishing in Bristol Bay began about the same time as in previous years. Soviet king crab catches in the east Bering Sea decreased considerably in 1965 after the U.S.-U.S.S.R. agreement on king crab fishing early 1965. In 1964 the Soviets fished in Eastern Bering Sea from April-July using 3 king crab factoryships, 9 net-setting medium trawlers, and 33 pick-up boats. With this fleet of 45 king crab fishing vessels, the Soviets landed 2.8 million male crabs and produced about 72,000 cases of canned crab. In 1965, the same number of vessels operating from April to June caught 2.2 million crabs but produced only about 45,000 cases, a decrease of 37.6 percent and an indication that smaller crabs were landed. In 1965, the Soviets ended crab fishing in the

Eastern Bering 1 month earlier than in previous years, probably to fish in other parts of the Bering sea for saury, pollock, and other species. Despite the effort, the Soviet Far Eastern crab fleet failed to meet its yearly production quota in 1965.

Japanese: At the end of March about 60 Japanese fishing vessels were operating off Alaska. Three Japanese factoryships were in the Bering Sea, presumably for Alaska pollock. One factoryship, accompanied by 11 trawlers, was located about 100 miles west of the Pribilof Islands. The second factoryship, with six trawlers, continued operations about 50 miles north of Unalaska Island. The remaining factoryship, accompanied by about 30 trawlers, fished about 150 miles west of Port Moller.



Fig. 3 - Japanese king crab factoryship operating in North Pacific.

One of the three Japanese factory trawlers reported fishing in March in the Bering Sea Triangle Area north of Unalaska Island returned to Japan. The two remaining trawlers continued fishing in the same area. Two additional Japanese factory trawlers continued to fish off the central Aleutians.



Fig. 4 - Sorting and weighing crab meat prior to freezing aboard a Japanese crab factoryship in North Pacific.

A crab factoryship with five net-setting trawlers operated on the outer Bristol

Bay "flats" about 150 miles west of Port Moller.

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OFF PACIFIC NORTHWEST:

Soviet: In early March large concentrations of Soviet fishing vessels (which were reported in February fishing from Dixon Entrance to Queen Charlotte Sound) switched north off Central Alaskan waters. A few large stern trawlers and medium trawlers, however, remained in the general area of Queen Charlotte Sound presumably fishing for Pacific ocean perch.

Throughout February 1966, the research vessel Adler was observed conducting fishery explorations off the Pacific coasts. On February 17, she was sighted about 17 miles west of Coos Bay, Oregon. By February 22, the Adler was off Willapa Harbor, Washington. At the end of the month she docked in Vancouver, British Columbia (Canada), to get supplies and fuel. In March 1966, the Adler was reported off the California coast, according to Soviet sources.

The American Telephone and Telegraph Company's underwater cable which runs between Seattle and Alaska has been severed twice since the Soviet fleets began fishing off Dixon Entrance early 1966. The second break, which occurred on January 24, 1966, forced the company to bring its cable repairship all the way from Hawaii. The ship remained in the area until March 5 patrolling the cable areas.

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IN NORTHWEST ATLANTIC:

Soviet: In early March Soviet fishing activities in the Northwest Atlantic off U. S. coasts were particularly heavy when 71 fishing vessels (including 52 large stern trawlers) were sighted during one single surveillance flight. By mid-month, however, it was observed that fishing was poor (lack of fish on decks of Soviet trawlers) and by March 16 only about 30 Soviet fishing vessels were sighted in the Northwest Atlantic. The rest switched to hitherto little exploited mid-Atlantic waters off New Jersey and Virginia.

Soviet fishing vessels on Georges Bank during March showed a slight increase over the previous month. A total of 107 vessels were sighted as compared with 92 vessels

sighted during February 1966, and 42 vessels in February 1965. The vessels sighted in March were identified as 67 factory stern trawlers, 6 processing and refrigerated freezer trawlers, 19 side trawlers, 4 medium side trawlers, 6 refrigerated transports, 1 factoryship, 2 fuel and water carriers, 1 tug, and 1 passenger transport. Fishing operations ranged along the 100-fathom curve of the Continental Shelf from south of Long Island (Hudson Canyon), eastward to the southwest and southeast parts of Georges Bank (Lydonia and Corsair Canyons). These same areas were fished by the Soviets also in 1965 and like then catches were primarily whiting and red hake.



Fig. 5 - Soviet processing and refrigerated factoryship operating in Northwest Atlantic. Standing by are Pioneer-class Soviet trawlers.

The Soviet fleets, operating in groups of 30 to 40 vessels, were located 50 to 70 miles south of Block Island, and 30 to 40 miles south and southeast of the Nantucket lightship. They also fished in the southeast part of Georges Bank.

Spanish: A U. S. fishing vessel from Boston reported that a fleet of about 30 Spanish trawlers began pair-trawling in the southeast part of Georges Bank. Presence of Spanish trawlers was confirmed; at least 15 were sighted near Corsair Canyon during March surveillance patrols.

Boarding of Polish Trawler "Virgo": On April 1, 1966, a Polish trawler (the *Virgo* GDY-309) requested permission from the U. S. Coast Guard to enter the Port of Boston for repairs to its trawl winch. A boarding party, including U. S. Bureau of Commercial Fisheries personnel, inspected the vessel, which remained in Boston until April 8.

The *Virgo* is one of 14 Polish stern trawlers (2,800 gross tons each) fishing for cod off Labrador. In May they were expected to switch to the Atlantic Ocean perch fishery. The *Virgo's* yearly quota is 5,200 metric tons of frozen fish (exclusive of fish meal). Part of the catch is packed in English-labeled cartons, landed at St. Pierre et Miquelon (French) and transhipped aboard Canadian transports to the United States.

* * * * *

OFF MID-ATLANTIC COASTS:

Soviet: During March, two surveillance flights were conducted along the middle Atlantic Coast areas in response to reports concerning substantial Soviet fishing activity from southeast of Cape May, N. J., to Cape Hatteras, N. C. A total of 34 Soviet vessels were sighted on the 2 flights and identified as 31 factory stern trawlers, 2 processing and refrigerated freezer trawlers, and 1 fuel and water carrier.

Twenty-three of the 34 vessels were located in a 60-mile area from 70 miles east of Cape Henry, Va., to 70 miles southeast of Cape May, N. J. Moderate catches of fish on deck appeared to be primarily whiting with lesser amounts of scup (porgies). All vessels were using heavy bottom-tending trawls.

The remaining 11 vessels were located in a 30-mile area 90 miles east of Atlantic City (Hudson Canyon). Those vessels engaged in fishing operations had heavy to moderate catches on deck--primarily red hake and whiting. Several vessels were under way heading in a southerly direction.

This was the largest concentration of Soviet fishing vessels ever observed as a result of periodic surveillance flights along the mid-Atlantic areas. Soviet fishing activity in those areas was negligible in 1965. In the spring of 1964, however, factory stern trawlers and 12 side trawlers did fish for scup off the Virginia and North Carolina coasts.

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IN THE GULF OF MEXICO AND CARIBBEAN:

Soviet: Like in 1965, there has been an increase of Soviet fishing activities in the Gulf of Mexico and Caribbean. It is believed that at least a dozen or more medium and large trawlers fished for various species in early

April 1966. That the U.S.S.R. must have a considerable number of vessels in the area is evident from the fact that in February the Soviet passenger ship Baltika arrived at Ha-

vana, Cuba, with about 350 Soviet fishermen aboard. They replaced Soviet fishermen who were due to go home on leave.

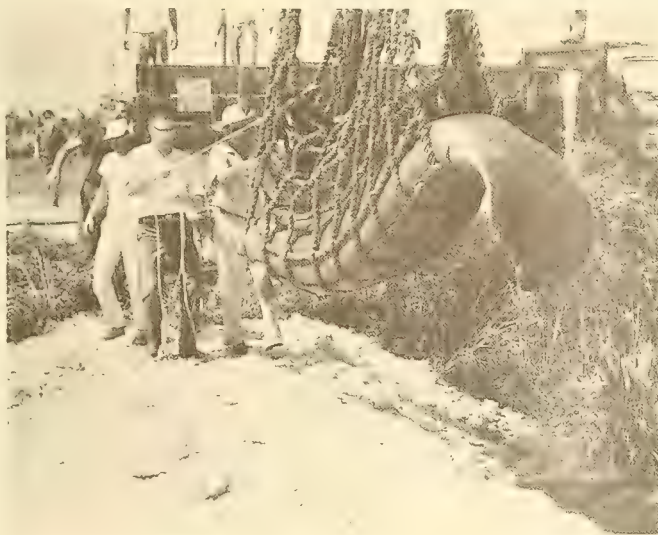


SEA COWS SHOW PROMISE AS "WEED CONTROLLERS"

A sea cow safari into the jungles of Panama was made in late September 1965 by State officials of the Florida Central and Southern Flood Control District (FCD).

The possibility of using manatees (known as sea cows) to control aquatic weeds is being studied under a Florida State project as well as under a Federal project in the Canal Zone.

Manatees can grow to more than 12 feet in length. They are strict vegetarians and have proved to be excellent weed eaters. But aside from their eating habits, not too much is known about these unusual mammals. More information is needed about their life cycle, particularly their rate of reproduction.



In June 1964 a manatee was lowered into a fenced-off section of a canal in Florida. That was the start by the Central and Southern Florida Central District of a three-year study of manatees and their usefulness in controlling aquatic weeds.

The Panama visit was planned to give Florida researchers an opportunity to visit a remote area in the Panamanian jungle where 5 adult sea cows and a juvenile were penned in a 7-acre lagoon. The visit also provided a valuable opportunity to exchange information.

The Florida Central and Southern FCD is currently spending \$200,000 a year to keep its waterways clear of vegetation. Unless some new method of weed control is discovered--such as the use of manatees--the District's weed control costs may increase to \$500,000 a year when the Flood Control Project is completed.

The total cost of aquatic weed control in Florida--including expenditures by cities, counties, drainage districts, individuals, and State and Federal agencies--runs into several million dollars annually. It is estimated that if weeds were left untreated, all the inland waterways in the southern United States would be choked with vegetation and impassable to navigation within 3 years. (News Release Central and Southern Florida Flood Control District, West Palm Beach, Fla.)

Note: See Commercial Fisheries Review, Oct. 1964 p. 107 and Dec. 1964 p. 106.



FEDERAL ACTIONS



Department of the Interior

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT

FEDERAL AID FOR FISHERY PRODUCTS:

Following is a listing of the approved projects under the Commercial Fisheries Research and Development Act--Public Law 88-309, which is administered by the Department of the Interior's Bureau of Commercial

Fisheries. The list includes those projects approved through December 31, 1965.

Public Law 88-309, which was signed by the President on May 20, 1964, provides for payment of \$5 million annually to States for commercial fishery research and development over a five-year period. The States will be required to provide matching funds equal to at least 25 percent of project costs.

State	Project	Title	Total First Year Cost	Date Approved
Alaska	5-9-R	Investigations of Ecological Factors Limiting Production of the Alaskan Pandalid Shrimp	\$ 25,000	11/18/65
Alaska	5-6-R	Cook Inlet Sockeye Salmon Investigations.	50,000	10/1/65
Alaska	5-3-D	Expansion of Current and Development of Additional Commercial Fisheries Catch, Production and Gear Statistics.	13,500	10/1/65
Alaska	5-4-R	Pink Salmon Optimum Escapement and Forecast Research.	5,500	10/1/65
Alaska	5-7-R	Investigation of Factors Limiting the Production of Sockeye Salmon in Lakes	22,000	10/1/65
Alaska	5-10-R	Dungeness Crab Research in Southeastern Alaska	15,600	10/1/65
Alaska	5-11-R	Reproduction of King Crabs in the Kodiak Island Area	46,100	10/1/65
Alaska	5-8-R	Monitoring the Effects of Land Use on Salmon Production	15,800	8/18/65
Alaska	5-1-S	Coordination.	33,000	8/25/65
Alaska	5-5-R	Kvichak River Smolt Study	32,000	10/18/65
Arizona	6-1-R	Investigation of Commercial Fishery Potentials in Reservoirs	13,732	12/9/65
California	6-3-R	Fisheries Resources Sea Survey	53,000	12/3/65
California	6-4-R	Shellfish Laboratory Operations	16,460	12/9/65
Delaware	3-8-D	Rehabilitation of the Natural Seed Oyster Beds in Delaware.	40,000	7/22/65
Florida	2-11-D	Marketing	257,444	9/15/65
Florida	2-15-R	A Survey of Florida's Commercial Clam Populations	30,000	11/4/65
Georgia	2-10-R	Feasibility Study of Methods for Improving Oyster Production in Georgia	40,300	9/28/65
Idaho	1-1-D	Experimental Rearing of Chinook Salmon and Steelhead Trout at Hayden Creek Ponds	3,300	9/24/65
Idaho	1-9-C	Construction of Hayden Creek Rearing Ponds	23,600	9/24/65
Indiana	4-10-R	Mussel Research Study.	16,360	12/16/65
Iowa	4-11-R	Industrial and Commercial Food Fish Investigations	20,000	12/30/65
Kansas	4-1-R	Investigations on Digestion and Metabolism of the Channel Catfish	17,320	7/8/65
Louisiana	2-20-S	Coordination.	6,300	11/4/65
Louisiana	2-23-D	Oyster Lease Control Monuments.	115,350	12/3/65
Louisiana	2-22-R	Ecology of Louisiana's Estuarine Waters	136,750	12/9/65
Louisiana	2-21-R	Coastwide Study of Penaeid Shrimp	152,400	12/9/65
Louisiana	2-24-D	Shell Planting for Oyster Cultch	65,000	12/1/65
Maine	3-13-D	Maine Marine Fisheries Extension Service	25,464	9/15/65
Maine	3-24-D	Promotion and Market Development.	49,100	10/18/65
Maine	3-18-R	Investigation of Physical Aspects of Raw Herring	12,000	12/2/65
Maine	3-12-R	Northern Shrimp - Biological and Technological Research	35,232	12/3/65
Maine	3-14-R	Lobster Research Program	68,819	12/13/65
Maine	3-16-R	Biological, Environmental and Technological Research on Marine Worms	40,000	9/17/65
Maine	3-17-D	Study of the Economic and Operation Feasibility of Mechanization of the Maine Sardine Processing and Canning Operations	35,000	9/15/65
Maryland	3-21-R	Determination of the Distribution and Abundance of the Winter Flounder	13,584	9/21/65
Maryland	3-23-R	Study of the Effects of Thermal Pollution on the Eastern Oyster in the Patuxent River Estuary	8,112	10/4/65
Maryland	3-27-R	Tagging of Juvenile Striped Bass in Chesapeake Bay Estuaries	16,800	11/5/65

(Listing continued on next page.)

State	Project	Title	Total First Year Cost	Date Approved
Maryland	3-28-R	Effects of Municipal and Industrial Waste Discharges on the Marine Resources of the Chesapeake Bay	\$ 36,000	10/28/65
Maryland	3-29-R	Studies of the Physical Processes of Movement and Dispersion of Oyster Larvae	18,000	10/29/65
Maryland	3-42-D	An Economic Study of the Fisheries and Seafood Processing Industries with Emphasis on the Chesapeake Bay Area	13,670	12/9/65
Maryland	3-25-C	Construction of Research Laboratory Facility to be Used for Studying Temperature Effects on Estuarine Organisms	4,770	12/9/65
Maryland	3-26-R	Studies of the Physical and Chemical Properties of the Estuarine Environment Associated with Fish Kills	21,000	9/28/65
Maryland	3-30-R	Suspended Sediments in the Upper Chesapeake Bay	24,000	11/5/65
Massachusetts	3-36-D	Design, Fabrication, and Test of a Prototype Improved Fish Washing Box for Otter Trawlers	5,000	11/30/65
Massachusetts	3-37-D	Collection, Compilation, Evaluation and Dissemination of Commercial Fisheries Statistics	21,662	12/3/65
Massachusetts	3-34-R	Mass Production of Larval and Juvenile Shellfish under Laboratory Conditions, and Investigations upon their Survival and Rate of Growth under Natural Conditions.	57,500	12/22/65
Michigan	4-2-R	Surveillance of Lake Trout Restoration in Michigan Waters of Lake Michigan	33,750	7/23/65
Minnesota	4-8-R	Minnesota Commercial Fisheries Improvement	10,416	9/15/65
Mississippi	2-25-R	Population Studies of Exploited Crustaceans and Fishes in a Northern Gulf of Mexico Estuary with Special Reference to the Effects of Brood Success on Commercial Availability	97,291	12/8/65
Missouri	4-3-R	Research and Management of Commercial Fisheries	17,208	9/15/65
Montana	1-20-C	Construction of Fishery Research Vessel for Fort Peck Reservoir Fishery Investigation	20,000	12/20/65
Montana	1-19-D	Fort Peck Reservoir Fishery Investigations	20,000	12/16/65
New Hampshire	3-31-R	Soft-shell Clam Population Study in Hampton-Seabrook Harbor, New Hampshire	4,800	11/4/65
New Hampshire	3-32-R	An Investigation of the Possibility of Seed Oyster Production in Great Bay, New Hampshire.	24,900	11/4/65
New Jersey	3-1-D	Shell Planting Program - Maurice River Cove and Mullica River.	200,000	6/25/65
New Jersey	3-2-R	Evaluation of the Menhaden and Shad Fishery in Delaware Bay and Adjacent Waters	22,002	7/19/65
New York	3-11-D	Pilot Plant Depuration of Hard Clams	39,000	9/15/65
New York	3-9-D	Management Planning for New York Freshwater Commercial Fisheries	24,000	11/4/65
North Carolina	2-9-R	Studies on Macroplanktonic Crustaceans and Ichthyoplankton of the Pamlico Sound Complex	12,000	9/29/65
North Carolina	2-6-R	Oyster Studies	24,200	8/6/65
North Carolina	2-8-R	A Study of the Quality of North Carolina Scallops.	12,500	8/17/65
North Carolina	2-26-R	Shrimp Studies.	28,334	12/8/65
Ohio	4-6-R	Lake Erie Commercial Fisheries Research	48,000	9/15/65
Oregon	1-10-D	Development of the Shad Industry	16,250	12/14/65
Oregon	1-12-R	Utilization of Hake, Dogfish, and By-products of the Fillet Industry for Protein Supplements	16,000	12/16/65
Oregon	1-14-D	Utilization of Shrimp Waste	11,100	12/16/65
Oregon	1-3-R	Study on the Distribution & Abundance of Pink Shrimp in the Pacific Ocean off Oregon	30,291	9/17/65
Oregon	1-5-R	Controlled Rearing of Dungeness Crab Larvae and the Influence of Environmental Conditions on their Survival	10,212	9/17/65
Oregon	1-4-R	Investigation of the Abundance and Recruitment of Bottomfish and Pacific Ocean Perch	20,802	9/21/65
Oregon	1-8-S	Coordination	5,000	7/23/65
Oregon	1-15-R	Processed Hake in Feed for Mink	6,000	9/15/65
South Carolina	2-1-C	Construction of Large Size Shrimp Farm Pond, to Demonstrate the Economic Potential of Shrimp Culture	9,928	7/8/65
South Carolina	2-3-R	To Manage and Practice Aquaculture in a Large Size Shrimp Farm Pond	6,960	7/8/65
South Carolina	2-2-R	Charting of Subtidal Oyster Beds and Experimental Transplanting of Seed Oysters thereto from Polluted Seed Oyster Beds	17,804	7/19/65
Tennessee	4-5-R	Development of Improved Fishing Methods for Use in South Eastern & South Central Reservoirs	27,334	9/15/65
Texas	2-12-R	An Evaluation of the Effects of Estuarine Engineering Projects	13,440	10/18/65
Texas	2-13-C	Construction of a Gulf Research Vessel	85,000	10/22/65
Texas	2-14-C	Coastal Fisheries Experiment Station	45,000	10/22/65
Virginia	3-5-D	Investigation of Potential for Expansion of the Industrial Fishery of the Mid-Atlantic Bight	49,849	9/17/65
Virginia	3-7-R	Investigations of Oyster Larvae and Spat and Certain Important Environmental Factors in an Horizontally Stratified Estuary	140,800	9/15/65
Virginia	3-19-R	Characterization of Coastal and Estuarine Fish Nursery Grounds as Natural Communities	30,100	9/17/65
Washington	1-21-C	Construction of Small Fishways	22,000	12/16/65

(Listing continued on next page.)

State	Project	Title	Total First Year Cost	Date Approved
Washington	1-17-S	Coordination of Projects under P.L. 88-309	\$ 12,000	9/28/65
Washington	1-18-R	Investigation of Effects of Specific Areas of Grays Harbor on the Emigration of Yearling Coho Salmon from the Rivers Emptying into that Harbor	4,667	11/18/65
Wisconsin	4-7-R	Assessment of Lake Trout Restoration in the Wisconsin Waters of Lake Michigan	27,333	9/15/65

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FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

REQUEST TO U. S. FOOD AND DRUG ADMINISTRATION FOR APPROVAL OF FISH PROTEIN CONCENTRATE MADE FROM FISH:

Secretary of the Interior Udall submitted in late February 1966, a petition to the Food and Drug Administration (FDA) to approve as a food additive a protein concentrate made from whole fish by researchers of Interior's Bureau of Commercial Fisheries.

The marine protein concentrate, made from Atlantic hake in the experiments, is approximately 80 percent protein. The remaining 20 percent is made up largely of beneficial minerals. Approximately six pounds of fish are processed to produce one pound of a concentrate that is virtually odorless and tasteless. The Bureau's model unit plant at Beltsville, Md., has a capacity of 100 pounds a day.

Bureau researchers have found that the product blends well with other forms of food. It was successfully tested as an ingredient in

beverages, noodles, gravy, bread, and cookies. The addition of marine protein concentrate to those products materially increases their nutritive value.

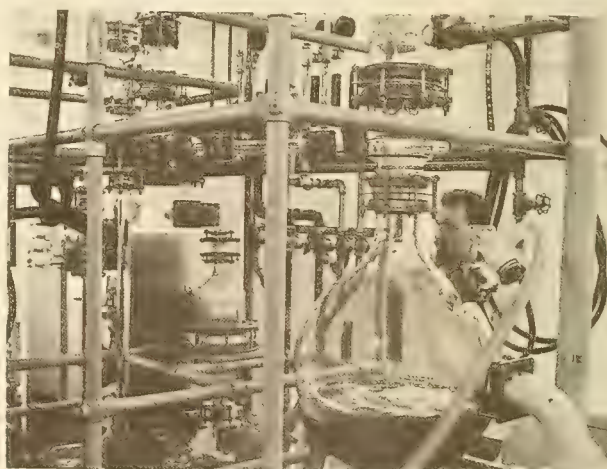


Fig. 2 - Scientist conducting solvent extraction experiments with large glass laboratory equipment, Bureau of Commercial Fisheries Technological Laboratory, College Park, Md.

Secretary Udall told FDA that Bureau scientists worked for 3 years to develop pro-

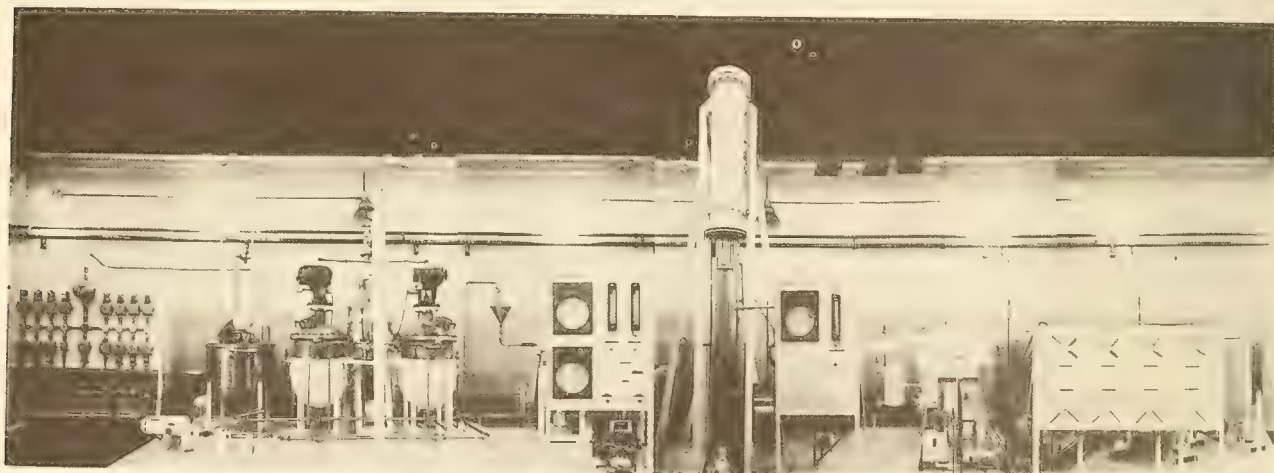


Fig. 1 - Extraction model unit for the manufacture of marine protein concentrate by use of solvent, Bureau of Commercial Fisheries Food Engineering Research Laboratory, Beltsville, Md.

cedures for manufacturing a nutritious and completely wholesome product. Late in 1965, the results of their tests were reviewed by the Marine Protein Resource Development Committee of the National Academy of Science. On December 1, 1965, the Academy advised the Secretary that "in the Committee's judgment, fish protein concentrate from whole hake, as prepared by the Bureau's process, is safe, nutritious, wholesome, and fit for human consumption."

The Director of the Bureau of Commercial Fisheries said the concentrate can contribute much to ending "protein starvation," the most urgent food problem of the century, for about two-thirds of the world's population. He said studies show that if only the unharvested fish in United States coastal waters were made into the concentrate, it would provide the additional high quality protein to balance the diet of one billion people for 300 days at a cost of about a half cent per person per day.

Notice of the Department of the Interior's petition appeared in the Federal Register, March 2, 1966.

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INCREASED INTEREST RATE ON FISHERIES LOANS EFFECTIVE APRIL 1, 1966:

An increase in the interest rate on fisheries loans from 5 to 5½ percent as proposed on March 1, 1966, by the Department of the Interior's Bureau of Commercial Fisheries became effective April 1, 1966. (Federal Register, March 29, 1966.)

Interested persons were given 20 days within which to submit written comments, suggestions, or objections with respect to the proposed increase. No comments, suggestions, or objections were received.

Donald L. McKernan, Director of the Bureau of Commercial Fisheries, which administers the loan program, explained that the increase is necessary to make the rate consistent with interest rates on other public loans of comparable maturity.

The fisheries loan fund was established by a section of the Fish and Wildlife Act of 1956, which authorized the Secretary of the Interior to make loans for financing and refinancing the operations of commercial fishing vessels and gear. The Department of the Interior is authorized to make such loans through June 30, 1970.

Another provision of the loan fund legislation states that the purchase of a new vessel must not cause economic injury to efficient vessel operators working in the area where the new vessel will operate.

The loan program has filled the credit gap for fishermen, insuring the continued operation of their vessels, and is helping to upgrade and modernize the commercial fishing fleet of the United States.

Notice of the proposed rate increase as it appeared in the Federal Register, March 5, 1966, follows:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

[50 CFR Part 250]

FISHERIES LOAN FUND PROCEDURES

Change of Interest Rate

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by the Fish and Wildlife Act of 1956, as amended (16 U.S.C. 742c), it is proposed to amend Part 250, Title 50 Code of Federal Regulations, as set forth below. Public Law 89-85 amended section 4 of the Fish and Wildlife Act of 1956 by providing that any fisheries loans shall "Bear an interest rate of not less than (a) a rate determined by the Secretary of the Treasury, taking into consideration the average market yield on outstanding Treasury obligations of comparable maturity, plus (b) such additional charge, if any, toward covering other costs of the program as the Secretary may determine to be consistent with its purpose." The average market yield of outstanding Treasury obligations of comparable maturity has risen substantially since passage of the Act. The purpose of this amendment is to increase the interest rate charged on fisheries loans authorized on and after the effective date of the amendment from 5 percent to 5½ percent.

This proposed amendment relates to matters which are exempt from the rule making requirements of the Administrative Procedure Act (5 U.S.C. 1003); however, it is the policy of the Department of the Interior that, whenever practicable, the rule making requirements be observed voluntarily. Accordingly, interested persons may submit, in triplicate, written comments, suggestions, or objections with respect to the proposed amendment to the Director, Bureau of Commercial Fisheries, Department of the Interior, Washington, D.C. 20240, within 20 days of the date of publication of this notice in the FEDERAL REGISTER.

Section 250.10 is amended by deleting "5 percent" and substituting "5½ percent" therefore.

DONALD L. MCKERNAN,
Director,
Bureau of Commercial Fisheries.

MARCH 1, 1966.

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APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Charles L. and B. J. Johnson, Box 18, Anchor Point, Alaska 99556, for the purchase of a used 42-foot overall length wood vessel to engage in the fishery for salmon, halibut, shrimp, and crabs. Notice of the application was published by the U. S. Department of the Interior's Bureau of Commercial Fisheries in the Federal Register, March 8, 1966.

Ronald Divers Watson, Route 1, Box 398, Marysville, Wash., 98270, for the purchase of a 37.5-foot overall length wood vessel to engage in the fishery for salmon. Notice of the application was published in the Federal Register, March 8, 1966.

Charles W. Beyers, 210 Ladera Court, Santa Cruz, Calif. 95061, for the purchase of a used 30-foot wood vessel to engage in the fishery for salmon and bottomfish. Notice of the application was published in the Federal Register, March 12, 1966.

James Mathew Torgerson, 1103 Fairfield St., Aberdeen, Wash. 98520, for the purchase of a used 73.6-foot registered length wood vessel to engage in the fishery for hake, bottomfish, herring, and crab. Notice of the application was published in the Federal Register, March 12, 1966.

Jack E. McFarland, 12012 36th Ave. NE, Seattle, Wash. 98125, for the purchase of a used 39.2-foot registered length wood vessel to engage in the fishery for salmon, albacore tuna, and halibut. Notice of the application was published in the Federal Register, March 12, 1966.

Howard Jake Bowman, Box 574, Seadrift, Tex. 77983, for the construction of a new 39-foot wood vessel to engage in the fishery for shrimp. Notice of the application was published in the Federal Register, March 17, 1966.

Robert Joseph Chasse, P. O. Box 201, Ketchikan, Alaska 99901, for the purchase of a used 40-foot wood vessel to engage in the fishery for salmon and halibut. Notice of the application was published in the Federal Register, March 31, 1966.

Karl Rosenberg and Hartzel West, Box 225, Seldovia, Alaska 99663, for the purchase of a used 29.8-foot registered length wood vessel to engage in the fishery for salmon. Notice of the application was published in the Federal Register, March 31, 1966.

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).
Note: See Commercial Fisheries Review, April 1966 p. 77.

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HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

Ralston Purina Co., Van Camp Division, 840 Van Camp St., Long Beach, Calif., 90802, has applied for a fishing vessel construction differential subsidy to aid in the construction of a 170-foot overall length steel vessel to engage in the fishery for tuna. A hearing on the economic aspects of this application was scheduled to be held. The U. S. Department of the Interior's Bureau of Commercial Fisheries published the notice of the application and hearing in the March 8, 1966, Federal Register.

Trawler Jeanne d'Arc, Inc., Tillson Wharf, Rockland, Maine 04841, has applied for a fishing vessel construction differential subsidy to aid in the construction of a 114-foot overall length wood vessel to engage in the fishery for groundfish, scallops, lobsters, and flounders. A hearing on the economic aspects of this application was scheduled to be held. The Bureau published the hearing notice in the March 8, 1966, Federal Register.

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HUTCHINSON NAMED TO HEAD INTERNATIONAL TRADE PROMOTION IN FISHERIES:

The assignment of Samuel J. Hutchinson of Seattle, Wash., to the newly created post of Chief, Office of International Trade Promotion, Bureau of Commercial Fisheries, Washington, D. C., effective March 15, 1966, was announced by the U. S. Department of the Interior.

Hutchinson, 58, has been Director of the Bureau's Pacific Regional Office with head-

quarters in Seattle since 1957. Earlier he was Assistant Regional Director in Portland, Oreg., for about nine years.



Samuel J. Hutchinson

participating in international trade fairs and trade missions.

Hutchinson was selected for the assignment because his 34 years in commercial fisheries has given him wide experience in scientific and administrative responsibilities. He brings to his new position extensive knowledge of the entire domestic fishing industry, including the foreign market potential of king crab, Alaskan shrimp, and canned and frozen Pacific salmon as well as the many other fishery products produced in the United States.

Hutchinson will organize the Foreign Trade Expansion Program with the cooperation of industry and Government agencies. His analyses of world market conditions will determine the direction and goals of the program. He will advise the fishing industry on ways and means of developing markets in foreign countries and he will be responsible for encouraging United States firms to participate in the program. He will represent the Bureau at national and international fishery meetings, and participate in meetings with policy-making officials of foreign governments to explain United States export practices and programs.

A native of Sunnyside, Wash., Hutchinson received a Bachelor of Science degree in fishery biology from the University of Washington's College of Fisheries and also took graduate courses at the University. He entered the Federal service with the old Bureau of Fisheries, then part of the Department of Commerce, in 1931.



The new position was created to help the domestic fishing industry increase its exports by introducing American fishery products abroad--thus developing new markets--and by

U. S. Tariff Commission

VALUATION LAWS OF THE UNITED STATES AND OF THE PRINCIPAL TRADING PARTNERS OF THE UNITED STATES:

In response to a resolution of the Committee on Finance of the United States Senate, dated February 9, 1966, the U. S. Tariff Commission has instituted an investigation to determine the methods of valuation used by the United States and by its principal trading partners in determining the duty applicable to imports.

The resolution directs the Commission to submit to the Senate Finance Committee not later than June 30, 1966, a preliminary report containing (a) a description of the methods of valuation used by the United States and of the principal trading partners of the United States (including those instances where valuation is in excess of the landed values) and (b) a comparative analysis of the basic differences between such methods of valuation and the valuation results they produce.

The resolution further directs the Commission to submit a final report not later than February 28, 1967, which shall include suggestions and recommendations for improvement of the customs valuation laws of the United States, including the Commission's views as to the feasibility and desirability of adopting the Brussels definition of value for customs purposes and as to means appropriate for adopting such definition of value with the least practicable effect on trade. (The Brussels definition of value was established under the Convention on Valuation of Goods for Customs Purposes, signed on December 15, 1950.)

The Commission urged all interested parties to submit written views pertinent to the investigation.



Department of the Treasury

U. S. COAST GUARD

ASSISTANCE TO NEW ENGLAND FISHING FLEET IN 1965:

The U. S. Coast Guard Search and Rescue Branch of the First Coast Guard District (all New England states except Connecticut) as-

sisted 235 commercial fishing vessels in the New England area during 1965.

Engine failure accounted for 152 of the causes for need of assistance, or 64 percent of the total calls for aid. Included in this category were situations where the main propulsion engine was unable to operate from a variety of ills such as fuel pump failure, clutch trouble, starting engine failure, bent or lost propellor, and broken shafts.

There were 28 vessels disabled due to the fouling of nets or towing wires in propellers. While further information is not available, it is assumed that the vessels' own fishing nets were the offenders in most cases, and not nets discarded by foreign vessels.

A total of 22 vessels requested medical advice for treatment of ill or injured crew men. In 14 of those emergencies Coast Guard rescue units evacuated the seamen by helicopter lifts and sped them to the nearest U. S. Public Health Service hospital. Medical advice from USPHS physicians, relayed to vessels through Coast Guard channels, played an important part in those operations.

Vessels in distress from taking water comprised slightly over 8 percent of the calls, or 20 in number. The furnishing of emergency water pumps by Coast Guard helicopters or surface craft played an important part in assisting vessels in danger of sinking. Seven vessels were saved by emergency dewatering equipment delivered by the Coast Guard on the high seas. The other craft were either towed or escorted to safety.

The lone fire reported ended in the destruction of the Boston based otter trawler Magellan on Georges Bank October 15, 1965. All crew members were rescued by the trawler Clipper.

In addition, New England lost 11 other fishing vessels in 1965. Among them was the tragic destruction of the scalloper Snoopy and the loss of 8 of its 11-man crew off the Virginia Capes by a live torpedo. The torpedo, snagged in the scallop dredge, exploded while the crew struggled to release the lethal weapon.

New Bedford lost 5 vessels, Portland-based vessels accounted for 3 losses, Gloucester recorded 2 foundering, while Boston and New London, Connecticut, fleets were each reduced by the loss of a single vessel.

With the exception of the heavy loss of life involved in the explosion of the Snoopy, the New England fleet escaped with the loss of 2 fishermen in 1965. Both casualties occurred on board New Bedford-based craft. The small trawler Susie O. Carver disappeared with her lone crew member while en route from Plymouth to New Bedford. Wreckage from the vessel was later found near the eastern entrance of the Cape Cod Canal.

One man was lost when a small dragger en route from New Bedford to the fishing grounds early in the morning of June 17, struck a submerged object, filled rapidly, and sank within a few minutes.

* * * * *

HEARING ON PROPOSED CHANGES IN NAVIGATION AND VESSEL INSPECTION RULES AND REGULATIONS:

The Merchant Marine Council held a meeting March 21, 1966, in Washington, D. C., for the purpose of receiving comments, views, and data on the proposed changes in the navigation and vessel inspection rules and regulations as set forth in the MMC Public Hearing Agenda, CG-249 dated March 21, 1966.

Of particular interest to the operators of commercial fishing vessels in the 200-gross-tons-and-over class is the Amendment to Subchapter P - Manning of vessels that provides that vessels equipped with full pilot-house control of the propulsion machinery would not be in violation of the rules if the vessel had in her service only a licensed chief engineer.

Present regulations require that two licensed engineers (one a chief engineer) shall be on board in charge of running the vessel's engine. The amendment reads - Add: However, uninspected vessels of 200 gross tons and over which are equipped with full pilot-house control of the propulsion machinery and on which there is no need for a person on watch at all times in the engineroom would not be in violation of 46 USC 224a if the vessel had in her service an appropriately licensed chief engineer.

Notice of the hearing appeared in the Federal Register, February 25, 1966.

* * * * *

REPORTS OF FOREIGN FISHING VESSELS WITHIN 200 MILES OF U. S. TERRITORIAL WATERS:

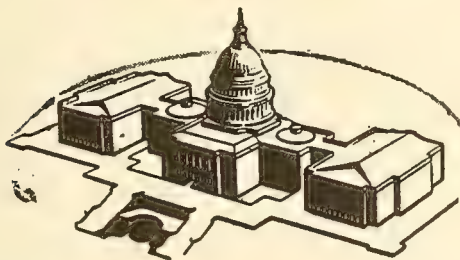
There has been an increase in the number of foreign flag-fishing vessels approaching the shores of the United States, according to the U. S. Coast Guard, Washington, D. C., in January 1966. In order to insure that such vessels are not operating in derogation of any laws of the United States, it is essential that all sightings of these vessels be reported promptly to the U. S. Coast Guard, or if more convenient to the nearest agent of the Department of the Interior's Bureau of Commercial Fisheries, who will in turn report to the Coast Guard. Commercial fishermen, party boat operators or any other persons sighting such vessels are requested to report as much of the following information concerning the sightings as practical:

- (a) Name and/or number of vessel.
- (b) Home port.
- (c) Flag displayed.
- (d) Date, time and position of vessel sighted.
- (e) Estimated course and speed of vessel sighted.
- (f) Any identifying configuration.



Eighty-Ninth Congress (Second Session)

Public bills and resolutions which may directly or indirectly affect the fisheries are reported upon. Introduction, referral to com-



mittees, pertinent legislative actions by the House and Senate, as well as signature into law or other final disposition are covered.

ANTIDUMPING ACT AMENDMENT: Rep. Curtis spoke in the House (*Congressional Record*, Mar. 8, 1966, pp. 5112-5116) concerning H. Res. 405, which he introduced June 1, 1965, directing the President to prepare an international agreement to harmonize the ad-

ministration of the antidumping laws and regulations of all nations. He inserted in the Record various material in support of his proposal. Also, he explored some objections to the provision of the Herlong-Hartke bill (H.R. 8510) which would amend the 1921 Antidumping Act, under which our present antidumping program is administered.

CLEAN RIVERS RESTORATION ACT OF 1966: H.R. 13262 (Rodino) introduced in House Mar. 3, 1966, to provide a program of pollution control and abatement in selected river basins of the United States through comprehensive planning and financial assistance, to amend the Federal Water Pollution Control Act, as amended, and for other purposes; to Committee on Public Works.

COMMERCIAL FISHERY RESOURCES SURVEY: Subcommittee on Merchant Marine and Fisheries of Senate Commerce Committee held hearings April 19, 1966, on S. J. Res. 29, to authorize and direct the Bureau of Commercial Fisheries, U. S. Department of the Interior, to conduct a survey of the marine and fresh-water commercial fishery resources of the United States, its territories, and possessions.

COMMITTEE MEMBERSHIP--MERCHANT MARINE AND FISHERIES: The House Mar. 29, 1966, adopted H. Res. 806, increasing the membership of the Committee on Merchant Marine and Fisheries during the remainder of the 89th Congress from 31 members to 32 members.

The House Mar. 30, 1966, adopted H. Res. 807, appointing Rep. Thomas to membership on the Committee on Merchant Marine and Fisheries.

COMMODITY PACKAGING AND LABELING: Introduced in House H.R. 13660 (Patten) Mar. 15, 1966, H. R. 13719 (Schmidhauser) Mar. 16, H. R. 13779 (Vivian) Mar. 17, H. R. 13951 (Hicks) Mar. 23, and H. R. 14155 (McCarthy) Mar. 30, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce, and for other purposes; to Committee on Interstate and Foreign Commerce.

Senate Committee on Commerce, Mar. 22, 1966, met in executive session to consider S. 985, proposed Fair Packaging and Labeling Act, but did not conclude action thereon, and was to meet again on Mar. 23.

ECOLOGICAL RESEARCH AND SURVEY: Senate Committee on Interior and Insular Affairs conducted an open hearing Apr. 21, 1966, on S. 2282, to authorize Stewart L. Udall, the Secretary of the Interior, to conduct a program of research, study, and surveys, documentation, and description of the natural environmental systems of the United States, for the purpose of understanding and evaluating the systems.

ESTUARINE AREAS--NATIONAL SYSTEM OF ESTUARINE AREAS: H. R. 13447 (Dingell) introduced in House Mar. 9, 1966, to authorize the Secretary of the Interior in cooperation with the States to preserve, protect, develop, restore and make accessible estuarine areas of the Nation which are valuable for sport and commercial fishing, wildlife conservation, recreation, and scenic beauty, and for other purposes; to Committee on Merchant Marine and Fisheries.

FACTORY-FISHING VESSELS: H. R. 13481 (Pepper) introduced in House Mar. 10, 1966, to assist the domes-

tic commercial fishing industry through the construction of three advanced-design factory fishing vessels; to Committee on Merchant Marine and Fisheries.

FEDERAL MEDICAL-HEALTH APPROPRIATIONS FY 1966: Rep. Hall in extension of his remarks inserted in Congressional Record, Mar. 14, 1966 (pp. 5513-5524), a report compiled by the American Medical Association, tabulating the Federal medical-health appropriations for fiscal year 1966. The Department of Interior's Bureau of Commercial Fisheries is listed with an amount of \$656,000 compared to \$681,100 last year. The Bureau conducts research projects to determine the possible medical- and health-related implications of fish oils, pesticides, and botulism as applied to fishery products and nutritional studies. Included are the following studies: (1) the effect of dietary oils on blood cholesterol; (2) the nutritional effect of oxidized marine oils; (3) oxidative deterioration of fish and fishery products; (4) fractional distillation of extracted fish oil for medical research purposes; (5) nutritional value of fish protein concentrate; (6) engineering studies to improve the processing methods of fish protein concentrates; (7) pesticide residues in fish and shellfish; and (8) botulism studies.

FISHERIES--OREGON: Rep. Wyatt spoke in the House (Congressional Record, Apr. 7, 1966, p. 7615) concerning the four Russian fishing ships which were dragging for bottom fish very close to the coast of Oregon. He estimated that they were taking one-half million pounds of fish each day. He further stated that he had appealed to the Secretary of State to protest to the Russian Government. . . . Also, he pointed out the necessity of the United States taking the lead in an effort to resolve the fisheries problem in the Northwest and in Alaska, involving this country, and the Governments of Russia, Japan, and Canada.

FISHING LIMIT OF 12 MILES: Introduced in House H. R. 13375 (Don H. Clausen), H. R. 13376 (Keith), H. R. 13377 (Mathias) Mar. 7, 1966, and H. R. 13479 (Morton) Mar. 10, to establish a contiguous fishery zone beyond the territorial sea of the United States; to Committee on Merchant Marine and Fisheries.

Rep. Mathias inserted in Congressional Record, Mar. 7, 1966 (pp. 4824-4825), a special report published in the January 1966 issue of Salt Water Sportsman titled "Henry 'Hal' Lyman Opines on the Longline Threat," by Hal Lyman.

Rep. Keith in extension of remarks (Congressional Record, Mar. 7, 1966, pp. 4827-4828), pointed out that this bill would reserve our coastal waters for American fishermen by claiming a zone of 9 miles beyond our present 3-mile territorial sea; would also conserve the resources within the 12-mile boundary; would cover only fishing and would imply no additional jurisdiction over these waters. He spoke of his recent trip to the Soviet Union where he witnessed the enormous strides that the Soviets have made in developing their fishing fleets and allied industries. He stated that Russia has a 12-mile territorial limit.

FISHING VESSEL CONSTRUCTION: H. R. 13728 (Tupper) introduced in House Mar. 16, 1966, to provide that whenever the United States constructs certain fishing vessels in foreign shipyards, equivalent vessels shall be simultaneously constructed in domestic shipyards; to Committee on Merchant Marine and Fisheries.

FISH PROTEIN CONCENTRATE PLANTS: Introduced in House H. R. 13347 (Don H. Clausen) Mar. 7, 1966, H. R. 13457 (Wyatt) Mar. 9, H. R. 13722 (Bates) Mar. 16, H. R. 14145 (McDowell) Mar. 30, H. R. 14268 (O'Neill) Apr. 4, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for production by the commercial fishing industry of fish protein concentrate; to Committee on Merchant Marine and Fisheries. Rep. Clausen in Congressional Record, Mar. 7, 1966 (pp. 4834-4835), pointed out that this bill would authorize the Secretary of the Interior to conduct and encourage research with a view to proving the feasibility of fish protein concentrate production; would also authorize the construction and maintenance of a number of experimental fish protein concentrate production plants, which will begin to develop processes to reduce fish to fish protein concentrate in large enough quantities as to make it practical on a commercial basis. He stated that he is hopeful that the Food and Drug Administration will retract its ruling that FPC is unfit for consumption because this means that this product cannot be sold in the United States nor can it be sold overseas under Public Law 480. He stated that it is his understanding that this decision will be reconsidered shortly.

Sen. Douglas spoke in the Senate (Congressional Record, Mar. 14, 1966, pp. 5427-5429), giving an account of some of the recent developments of fish protein concentrate. Senators Bartlett and Morse also made remarks from the floor in support of fish protein concentrate.

Senate Commerce Committee held hearings Apr. 25, 1966, in Aberdeen, Washington, and May 2-3 in Washington, D. C. on S. 2720, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for the production by the commercial fishing industry of fish protein concentrate.

FUR SEAL CONSERVATION AND PRIBILOF ISLANDS ADMINISTRATION: Pribilof Island Fur Seal Sales: Hearing before the Subcommittee on Foreign Aid Expenditures of the Committee on Government Operations, United States Senate, 89th Congress, 1st session, to review the Administration of Fur Seal Skin Operations in the Pribilof Islands, Sept. 23, 1965, Part 1, 168 pp., printed. Contents include statements and letters, and testimony of various Federal officials, Senators, and business representatives.

GATT TRADE CENTER IN GENEVA: Sen. Brewster spoke in the Senate (Congressional Record, Mar. 10, 1966, pp. 5288-5289) concerning his recent trip to Geneva representing the United States and the Senate Commerce Committee as congressional advisor to the American delegation to meetings at the GATT Trade Center in Geneva. He stated that he is presently preparing a complete report on the meetings and conferences he attended with the many representatives of different countries who were gathered in Geneva for the GATT (General Agreement on Trade and Tariffs) and UNCTAD (United Nations Conference on Trade and Development) meetings, which were in session simultaneously. Sen. Brewster explained the nature of these two organizations and the extent of present American involvement and participation in other international activities which are centered in Geneva.

HULL INSURANCE FOR COMMERCIAL FISHING VESSELS OF UNITED STATES. H. R. 14346 (Hagan)

introduced in House Apr. 6, 1966, to authorize the Secretary of the Interior to provide hull insurance for commercial fishing vessels of the United States; to Committee on Merchant Marine and Fisheries.

HUDSON RIVER RESTORATION: Introduced in House H.R. 13752 (Burton of California), H.R. 13760 (Joelson), H.R. 13777 (Todd) Mar. 17, 1966, H.R. 13858 (Farnsley) Mar. 22, H.R. 13948 (Udall), H.R. 13956 (Boland), H.R. 13957 (Cabell), H.R. 13958 (Mrs. Kelly), H.R. 13959 (Long of Md.), H.R. 13960 (Minish), H.R. 13961 (Pirnie) Mar. 23, H.R. 13987 (Fraser) Mar. 24, H.R. 14060 (Edwards of Calif.) Mar. 29, H.R. 14144 (Krebs), H.R. 14152 (Rodino) Mar. 30, H.R. 14193 (Howard) Mar. 31, and H.R. 14390 (Conyers) Apr. 7, to direct the Secretary of the Interior to cooperate with the States of New York and New Jersey on a program to develop, preserve, and restore the resources of the Hudson River and its shores and to authorize certain necessary steps to be taken to protect those resources from adverse Federal actions until the States and Congress shall have had an opportunity to act on that program; to Committee on Interior and Insular Affairs.

INTERIOR DEPARTMENT APPROPRIATIONS REQUEST, FY 1967: The subcommittee of the Senate Committee on Appropriations Mar. 3, 1966, continued its hearings on fiscal 1967 budget estimates for the Department of the Interior, and related agencies, received testimony from Donald L. McKernan, Director, Bureau of Commercial Fisheries and John S. Gottschalk, Director, Bureau of Sport Fisheries and Wildlife, both of the Fish and Wildlife Service.

Sen. Magnuson spoke in the Senate (Congressional Record, Mar. 15, 1966, pp. 5719-5722) concerning the welfare of the American fisherman and the fishing industry. He spoke in opposition to the Bureau of the Budget cutback of funds for fishery programs in the budget now before the Congress for fiscal year 1967. He stated that the budget for fiscal year 1967 recommends that from the general fund Congress appropriate \$28,036,000 for the Bureau of Commercial Fisheries--\$8,925,259 less than the general funds appropriated by Congress for the Bureau in the current fiscal year, and lower than its request for fiscal year 1965. In this connection, he inserted in the Record an article published in the Feb. 1, 1966, edition of the Washington Evening Star, titled "Programs Pared for Great Society," by James J. Kilpatrick. Among other things, Sen. Magnuson advised his fellow members of a report that the Soviet Union has discovered large gatherings of hake in the eastern section of the Pacific Ocean--stocks which may well be those which the U. S. is just preparing to harvest on a limited scale. He stated that he plans to urge the Appropriations Committee to adopt an additional funding of \$100,000 for the Pacific hake program so that America can achieve its share of this resource and participate on an equal footing in the future conservation of this resource.

H.R. 14215 (Denton) introduced in House Mar. 31, 1966, bill making appropriations for the Department of the Interior and related agencies (includes United States Fish and Wildlife Service and its two Bureaus: Commercial Fisheries, and Sport Fisheries and Wildlife) for the fiscal year ending June 30, 1967, and for other purposes; to Committee on Appropriations.

House Committee on Appropriations filed a report (H. Rept. 1405), Mar. 31, 1966, without amendment on H.R. 14215; to Committee of the Whole House on the State of the Union.

House Apr. 5, 1966, considered H.R. 14215, making appropriations for the Department of the Interior and

related agencies (includes United States Fish and Wildlife Service and its two Bureaus: Commercial Fisheries, and Sport Fisheries and Wildlife) for the fiscal year ending June 30, 1967. However, pursuant to a unanimous agreement of Mar. 30, the vote was postponed until Wed. Apr. 6. The House adopted an amendment submitted by Rep. Garmatz to increase appropriations for the Bureau of Commercial Fisheries from \$20,292,000 to \$20,312,000, which would provide \$20,000 for the staffing and operation of the Baltimore Fishery Market News Service Office. Rep. Denton spoke in the House (Congressional Record, Apr. 5, 1966, pp. 7282-7324), concerning several items of major interest in the bill which included Federal aid for commercial fisheries research and development, excess foreign currency authorization, and anadromous fish. Reps. Fascell, Wyatt, and Garmatz also spoke in support of fishery items included in the bill. Rep. Berry spoke in opposition to the increase of funds for the Bureau.

House Apr. 6, passed H.R. 14215.

Department of the Interior and Related Agencies Appropriations for 1967: Hearings before a Subcommittee of the Committee on Appropriations, House of Representatives, Eighty-Ninth Congress, 2nd Session; Part 1, Department of the Interior, Bureau of Commercial Fisheries, Bureau of Indian Affairs, Bureau of Land Management, Bureau of Outdoor Recreation, Geological Survey, National Park Service, 964 pp. printed; Part 2, Department of the Interior, Alaska Railroad, Bureau of Mines, Bureau of Sport Fisheries and Wildlife, Office of Coal Research, Office of Oil and Gas, Office of Saline Water, Office of Territories, Office of the Secretary, Office of the Solicitor, Office of Water Resources Research, 761 pp., printed. Included are testimony, statements and exhibits relating to funds for the Fish and Wildlife Service: the Office of the Commissioner and its two bureaus, Commercial Fisheries and Sport Fisheries and Wildlife.

H. Rept. 1405, Department of the Interior and Related Agencies Appropriation Bill, 1967 (Mar. 31, 1966, report from the Committee on Appropriations, U. S. House of Representatives, 89th Congress, 2nd session, to accompany H. R. 14215), 59 pp., printed. Committee submitted report in explanation of the bill making appropriations for the Department of the Interior and related agencies (includes the U. S. Fish and Wildlife Service and its two Bureaus: Commercial Fisheries and Sport Fisheries and Wildlife) for fiscal year 1967. Contains summary of bill, revenues, summary of increases and decreases, extent of activities funded in bill, and agency by agency discussion of funds requested.

MEMBERSHIP OF COMMITTEE ON MERCHANT MARINE AND FISHERIES: Rep. Casey (Texas) Mar. 8, 1966, submitted his resignation as a member of the House Committee on Merchant Marine and Fisheries. Same day House adopted H. Res. 755, electing Rep. Hathaway (Maine) and Rep. Jones (N.C.) to Committee on Merchant Marine and Fisheries. (Rep. Walter B. Jones was elected to the unexpired term of the late Mr. Bonner.)

MINIMUM WAGE: H.R. 13712 (Dent) introduced in House Mar. 16, 1966, to amend the Fair Labor Standards Act of 1938 to extend its protection to additional employees, to raise the minimum wage, and for other purposes; to Committee on Education and Labor. Similar to H.R. 10275.

NATIONAL SEA GRANT COLLEGES AND PROGRAM ACT OF 1965: H.R. 13482 (Pepper) introduced in House

Mar. 10, 1966, to amend the National Science Foundation Act of 1950, as amended, so as to authorize the establishment and operation of sea grant colleges and programs by initiating and supporting programs of education, training, and research in the marine sciences, to facilitate the use of the submerged lands of the Outer Continental Shelf by participants carrying out these programs and for other purposes; to Committee on Science and Astronautics.

NATIONAL WATER COMMISSION ACT: S. 3107 (Jackson and 8 others) introduced in Senate Mar. 21, 1966, to provide for a comprehensive review of national water resource problems and programs, and for other purposes; to Committee on Interior and Insular Affairs. Sen. Jackson pointed out in (Congressional Record, Mar. 21, 1966, pp. 6047-6049), that this bill was submitted by the Bureau of the Budget and would carry out the President's recommendation as stated in his message of Feb. 23 on preserving our national heritage; would provide for the establishment of a seven member commission of distinguished citizens outside of government and would direct them to consider all aspects of present and anticipated national water problems. He inserted in the Record the text of the bill, together with the letter from the Bureau of the Budget explaining the bill.

Introduced in House H.R. 13849 (Aspinall) Mar. 22, 1966, H.R. 13940 (Reinecke) Mar. 23, and H. R. 14151 (Rodino) Mar. 30, to provide for a comprehensive review of national water resource problems and programs, and for other purposes; to Committee on Interior and Insular Affairs.

Rep. Reinecke spoke in the House and pointed out in Congressional Record, Mar. 23, 1966 (p. 6273), that he had introduced an almost identical bill last July (H.R. 9895) but that the several agencies concerned in the executive branch failed to respond to the Committee's request for reports. The bill being introduced came from the executive branch, and the Congressman's sponsorship of it comes from his interest in seeing that the legislation is passed rather than any pride of authorship.

The House received a letter from the Director, Bureau of the Budget, transmitting a draft of proposed legislation to provide for a comprehensive review of national water resource problems and programs, and for other purposes to Committee on Interior and Insular Affairs.

NATURAL RESOURCES CONFERENCE: Sen. Metcalf spoke in the Senate (Congressional Record, Mar. 29, 1966, pp. 6645-6647), concerning the 31st. North American Wildlife and Natural Resources Conference which was held in Pittsburgh, Pa., last week. He stated that the theme of the meeting was "Renewing Our Resources Environment," and that the sessions of the conference devoted attention to, among other things, air and water pollution, natural beauty, and the pressures of urbanization on resources, fish and wildlife. He inserted in the Record the presentation entitled "Are Present Tools Enough?" which was delivered by Dr. Ira N. Gabrielson, president of the Wildlife Management Institute.

OCEANOGRAPHIC AGENCY OR COUNCIL: Senate Apr. 7, 1966 disagreed to House amendments to S. 944, to provide for expanded research in the oceans and the Great Lakes, and to establish a National Oceanographic

Council, asked for conference with House, and appointed conferees.

PRESIDENT'S MESSAGE--TRADE AGREEMENT: The President Mar. 14, 1966, transmitted to the Senate a copy of the trade agreement entered into between the United States and Canada on Dec. 17, 1965, covering reestablishment of concessions in the U.S. schedule to the General Agreement on Tariffs and Trade and covering new concessions to be included in such schedule to offset impairment in concessions negotiated with Canada; referred to Committee on Finance.

SUPPLEMENTAL APPROPRIATIONS 2ND, FY 1966: H.R. 14012 (Mahon) introduced in House Mar. 25, 1966, making supplemental appropriations for the fiscal year ending June 30, 1966, and for other purposes. House Committee on Appropriations Mar. 28, 1966, reported (H. Rept. 1349) on H.R. 14012, without amendment; referred to the Committee of the Whole House on the State of the Union. Includes additional funds for the Office of the Commissioner of Fish and Wildlife and the Bureau of Commercial Fisheries.

H. Rept. 1349, Second Supplemental Appropriation Bill, 1966 (Mar. 25, 1966, report from the Committee on Appropriations, U.S. House of Representatives, 89th Congress, 2nd session, to accompany H.R. 14012), 41 pp., printed. Discusses scope and summary of the bill.

The House Mar. 29, 1966, passed H.R. 14012, to make supplemental appropriations for the fiscal year ending June 30, 1966. The House Committee on Appropriations recommended (H. Rept. 1349) an appropriation of \$148,000, a reduction of \$55,000 below the budget request.

A subcommittee of the Senate Committee on Appropriations began hearings Mar. 29, 1966, on the proposed second supplemental appropriations for fiscal year 1966, received testimony from Harold E. Crowther, Deputy Director, Bureau of Commercial Fisheries, and other Government officials.

Second Supplemental Appropriation Bill, 1966: Hearings before the Subcommittee of the Committee on Appropriations, House of Representatives, 89th Congress, 2nd session, 612 pp., printed. Includes testimony, statements, and exhibits on additional funds for the Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife.

H. Doc. 383, Supplemental Appropriations for 1966: Communication from the President of the United States, transmitting Proposed Supplemental Appropriations for Various Agencies for Fiscal Year 1966, referred to Committee on Appropriations, House of Representatives, 89th Congress, 2nd Session, Feb. 21, 1966, 21 pp., printed. Includes, among others, additional funds for Bureau of Commercial Fisheries and Bureau of Sport Fisheries and Wildlife.

SOVIET TRAWLERS IN U. S. TERRITORIAL WATERS: Sen. Tower inserted in Congressional Record, Mar. 9, 1966 (pp. 5210-5212), an article that was printed in Navy magazine titled, "The Problem of Soviet Trawlers--Frequent Entry Into Our Territorial Waters by These Electronic-Laden Ships Calls for Tit-for-Tat Response by United States..." by Raymond Schuessler.

WATER POLLUTION: H.R. 13562 (Helstoski) introduced in House Mar. 14, 1966, to amend the Federal

Water Pollution Control Act in order to improve and make more effective certain programs pursuant to such act; to Committee on Public Works.

H. R. 13627 (Kupperman) introduced in House, Mar. 15, 1966, to amend section 8 of the Federal Water Pollution Control Act to authorize reimbursement of States and prefinance certain treatment works; to Committee on Public Works.

H.R. 13653 (Cleveland) and H.R. 13655 (Cramer) introduced in House Mar. 15, 1966, to amend Section 8 of the Federal Water Pollution Control Act to authorize reimbursement of States, municipalities, or intermunicipal or interstate agencies that wish to undertake the construction of treatment works in advance of the availability of funds; to Committee on Public Works.

House Committee on Government Operations Mar. 16, 1966, filed a report (H. Rept. 1330) on water pollution control and abatement, without amendment; referred to Committee of the Whole House on the State of the Union.

Sen. Randolph in extension of his remarks inserted in Congressional Record, Mar. 15, 1966 (pp. A1435-A1436), an address delivered Mar. 1, 1966, by Sen. Muskie before the American Water Works Association, Washington, D. C., titled "Water Quality and the National Interest."

Rep. Reinecke inserted in Congressional Record, Apr. 6, 1966 (pp. A2018-A2020), an article that appeared in the Mar. 1966 issue of Engineering and Science, titled "Controlling Ocean Pollution," by Dr. Norman Brooks, professor of civil engineering, California Institute of Technology.

WATER RESOURCE PROPOSALS--FEASIBILITY INVESTIGATIONS: S. 3034 (Jackson) introduced in Senate Mar. 7, 1966, and H. R. 13419 (Aspinall) introduced in House Mar. 9, to authorize the Secretary of the Interior to engage in feasibility investigations of certain water resource development proposals; to Committee on Interior and Insular Affairs. Sen. Jackson inserted in Congressional Record, Mar. 7, 1966 (4875-4876), a letter from Kenneth Holum, Assistant Secretary of the Interior, requesting the proposed legislation and stating the purpose and need for the bill.

The House Mar. 7, 1966, received a letter from the Assistant Secretary of the Interior, transmitting a draft of proposed legislation.

The Subcommittee on Water and Power Resources of Senate Committee on Interior and Insular Affairs held hearings Mar. 28, 1966, on S. 3034, to authorize feasibility investigations of certain water resource development proposals.

WATER RESOURCES RESEARCH: The Subcommittee on Irrigation and Reclamation of House Committee on Interior and Insular Affairs Mar. 17, 1966, met in executive session and approved for full committee action H.R. 3606 (amended), to promote a more adequate program of water research. Similar to S. 22.

House Mar. 21, 1966, received a communication from the President of the United States, transmitting a report of the Committee on Water Resources Research of the Federal Council for Science and Technology; to Committee on Interior and Insular Affairs.

Sen. Jackson inserted in Congressional Record, Mar. 21, 1966 (p. 6049), the letter from President Johnson transmitting a long-range water research report by the Committee on Water Resources Research of the Federal Council for Science and Technology.

Sen. McGovern inserted in Congressional Record, Mar. 21, 1966 (pp. 6095-6101), a statement by Sen. Anderson on the annual report of the Office of Water Resources Research, together with the letter of transmittal by the Secretary of the Interior.

House Committee on Interior and Insular Affairs, Mar. 23, 1966, met in open session and ordered reported favorably to the House H. R. 3606 (amended), to promote a more adequate national program of water research.

House Committee on Interior and Insular Affairs, Mar. 26, 1966, reported (H. Rept. 1350), with amendment H. R. 3606, to promote a more adequate national program of water research; referred to Committee of the Whole House on the State of the Union.

H. Rept. 1350, Promoting a More Adequate National Program of Water Research (Mar. 26, 1966, report from the Committee on Interior and Insular Affairs, U. S. House of Representatives, 89th Congress, 2nd session, to accompany H. R. 3606), 14 pp., printed. Committee reported bill favorably with amendments. Discusses purpose, major provisions of the bill, and changes in existing law.

The Senate Mar. 29, 1966, received a communication from the President, transmitting a report entitled "A 10-Year Program of Federal Water Resources Research" (with an accompanying report); to Committee on Interior and Insular Affairs.

The House Mar. 30, 1966, adopted H. Res. 801, providing for the consideration of and 1 hour of debate on H. R. 3606, to promote a more adequate national program of water research. The House then passed H. R. 3606. This passage was subsequently vacated and S. 22, a similar bill, was passed in lieu after being amended to contain the House-passed language. Several Representatives made remarks from the floor when considering the bill. Rep. Quillen pointed out in Congressional Record, Mar. 30, 1966 (pp. 6801-6802), that the purpose of H. R. 3606 is to improve current research programs in the field of water resources by amendment of the Water Resources Research Act of 1964 to provide authority to undertake a program of research into all aspects of water problems under the control of the Department. He stated that under H. R. 3606, research grants and contracts on a matching or other basis are provided for State agencies, universities, firms, and individuals working in the field; and authorizes \$85 million over a 10-year period.

Senate Apr. 5, 1966, concurred in the House amendment to S. 22, to promote a more adequate program of water research; thus clearing the bill for the President's signature.

WORLD HUNGER: H. R. 13667 (Tupper), to promote international trade in agricultural commodities to combat hunger and malnutrition, to further economic development, and for other purposes; to Committee on Agriculture.

Sen. Tydings inserted in Congressional Record, Mar. 22, 1966 (p. 6193-6195), a statement submitted by Sec-

retary of State, Dean Rusk, before the Senate Committee on Agriculture and Forestry, March 7, 1966, supporting S. 2933.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS: The U. S. Bureau of Commercial Fisheries has issued a leaflet on the status of most legisla-

tion of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL--3 "Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, Bureau of Commercial Fisheries, U. S. Department of the Interior, 1815 N. Fort Myer Drive, Rm. 510, Arlington, Va. 22209.



PROGRAM TO SAVE RARE ARIZONA TROUT

A program to save the rare native Arizona (or Apache) trout is being stepped up. Sponsored jointly by the U. S. Interior Department's Bureau of Sport Fisheries and Wildlife, Arizona and New Mexico fishery agencies, the Bureau of Indian Affairs, and the Apache tribe, the program is designed to protect the habitat of the fish and, if necessary, to increase its numbers by artificial propagation.

Once the Arizona trout was found in 360 miles of stream. Today the survivors can be found only in two small mountain streams--Ord Creek and the upper end of the White River's East Fork--on the 1,664,872-acre Fort Apache Reservation in east-central Arizona. The landlords are about 4,000 Apaches, who are cooperating in the effort to save the rare fish.

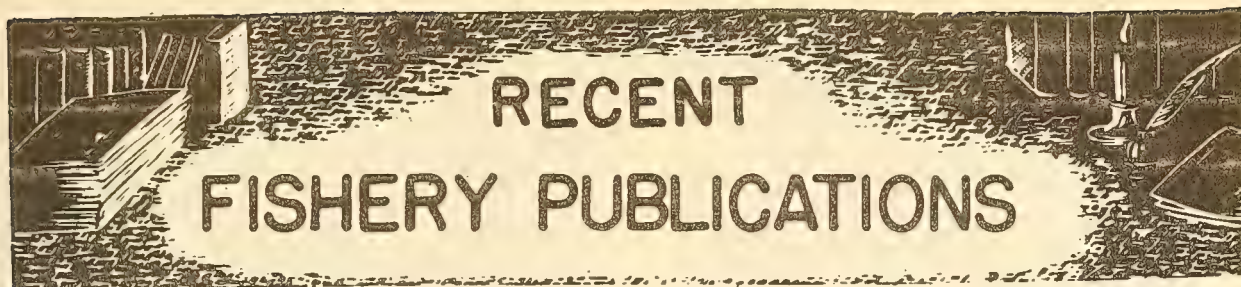
The Arizona trout is much smaller than the non-native rainbow and the Yellowstone cutthroat, which have been stocked in downstream waters. The small size of its two streams, and the resulting scarce food supply, has limited the average size of the fish to 5 to 6 inches, though it may reach 16 inches. Its back is a dark olive green and its belly and sides yellow gold. The yellow-gold color is always present in the pure strain and is often present in hybrid strains. It has minute scales and its spots are black and sharp; many of the spots are circled.

The Arizona trout spawns in March and April. The female lays between 200 and 600 eggs. Its nesting is similar to that of the rainbow trout. The female digs a "redd"--a shallow, round depression in gravel under running water. As she drops the eggs, the male, who is at her side, fertilizes them. The eggs are then covered with gravel and incubation begins. This requires 5 to 6 weeks, then the fry hatch, rise from under the gravel and begin searching for their food--small organisms in the stream.

In the summer of 1964, the White Mountain Apache Tribe and the Bureau of Indian Affairs asked the Bureau of Sport Fisheries and Wildlife to study the Arizona native trout and recommend a program to save it. A Bureau biologist studied the problem and recommended that 15-foot vertical dams be built on the two streams to prevent the upstream migration of competing fish--and that the water upstream of the barriers be restocked with the Arizona native trout.

He suggested, too, that a small lake be constructed where the trout would be able to maintain its own population by spawning in a live stream feeding the lake. If hatchery propagation becomes necessary or desirable, the lake would be a good source of eggs.

Eventually, the Arizona native trout will be given a scientific name and, together with the Gila trout (*Salmo gila*), may be brought back from the edge of extinction. The need is urgent. Both rare fish are presently at the mercy of an act of nature or man: a forest fire, a natural catastrophe, or a pesticide could destroy them. But, if things go according to plans for the next few years, there may even be limited fishing again for the two trout.



FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
SEP. - SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.
SSR. - FISH. - SPECIAL SCIENTIFIC REPORTS--FISHERIES (LIMITED DISTRIBUTION).

- | Number | Title |
|----------|---|
| CFS-3973 | - North Carolina Landings, October 1965, 4 pp. |
| CFS-3974 | - South Carolina Landings, September 1965, 3 pp. |
| CFS-3980 | - Frozen Fishery Products, November 1965, 8 pp. |
| CFS-3982 | - Maryland Landings, September 1965, 4 pp. |
| CFS-3988 | - Louisiana Landings, September 1965, 3 pp. |
| CFS-3992 | - Maryland Landings, October 1965, 4 pp. |
| CFS-3994 | - North Carolina Landings, November 1965, 4 pp. |
| CFS-3996 | - Virginia Landings, September 1965, 4 pp. |
| CFS-3998 | - South Carolina Landings, October 1965, 3 pp. |
| CFS-3999 | - Georgia Landings, October 1965, 3 pp. |
| CFS-4000 | - Frozen Fishery Products, December 1965, 8 pp. |
| CFS-4011 | - Georgia Landings, November 1965, 3 pp. |
| CFS-4013 | - South Carolina Landings, November 1965, 3 pp. |
| CFS-4018 | - Virginia Landings, October 1965, 4 pp. |
| CFS-4025 | - Maryland Landings, November 1965, 4 pp. |
| CFS-4026 | - Manufactured Fishery Products, 1964 Annual Summary, 9 pp. |
| CFS-4030 | - Virginia Landings, November 1965, 4 pp. |
| CFS-4031 | - North Carolina Landings, December 1965, 3 pp. |
| CFS-4033 | - Gulf Coast Shrimp Data, September 1965, 18 pp. |
| CFS-4035 | - California Landings, September 1965, 4 pp. |
| CFS-4036 | - Texas Landings, December 1965, 3 pp. |
| CFS-4037 | - California Landings, October 1965, 4 pp. |
| CFS-4039 | - Florida Landings, December 1965, 8 pp. |
| CFS-4042 | - Mississippi Landings, November 1965, 3 pp. |
| CFS-4043 | - Shrimp Landings, October 1965, 5 pp. |
| CFS-4045 | - Alabama Landings, November 1965, 3 pp. |
| CFS-4047 | - New York Landings, December 1965, 4 pp. |

- CFS-4049 - New Jersey Landings, December 1965, 3 pp.
CFS-4050 - Rhode Island Landings, November 1965, 3 pp.
CFS-4051 - Alabama Landings, December 1965, 3 pp.
CFS-4052 - Mississippi Landings, December 1965, 3 pp.
CFS-4055 - Packaged Fishery Products, 1965 Annual Summary, 5 pp.
CFS-4056 - Industrial Fishery Products, 1965 Annual Summary, 9 pp.
CFS-4057 - Canned Fishery Products, 1965 Annual Summary, 17 pp.
CFS-4058 - California Landings, November 1965, 4 pp.
CFS-4059 - Fish Sticks, Fish Portions, and Breaded Shrimp, 1965 Annual Summary, 4 pp.
CFS-4061 - Maine Landings, December 1965, 4 pp.
CFS-4062 - Shrimp Landings, November 1965, 5 pp.
CFS-4063 - Massachusetts Landings, September 1965, 9 pp.
CFS-4064 - Massachusetts Landings, October 1965, 9 pp.
CFS-4065 - California Landings, December 1965, 5 pp.
CFS-4067 - Massachusetts Landings, November 1965, 9 pp.
CFS-4068 - Fish Meal and Oil, January 1966, 2 pp.
CFS-4072 - Louisiana Landings, December 1965, 3 pp.
CFS-4073 - Rhode Island Landings, December 1965, 3 pp.
CFS-4076 - Florida Landings, January 1966, 8 pp.

Sep. No. 760 - Alaska Shrimp Explorations, 1962-64.

Sep. No. 761 - Gear and Technique of the Sea Bass Trap Fishery in the Carolinas.

FL-588 - List of Fishery Cooperatives in the United States, 1964-65, by Leslie D. McMullin, 16 pp., printed, August 1965. Includes names and addresses of fishery cooperatives throughout the United States. Gives in most instances the name of one of the officers of the coop, number of members, number of boats owned by members, type of each cooperative, and the major species of fish and shellfish caught.

SSR-Fish. No. 522 - Pelagic Fur Seal Investigations, 1964, by Clifford H. Fiscus and Hiroshi Kajimura, 52 pp., illus., Nov. 1965.

SSR-Fish. No. 524 - Stream Catalog of Southeastern Alaska, Regulatory District No. 9, edited by Norman Johnston, 199 pp., illus., Sept. 1965.

SSR-Fish. No. 525 - Comparative Study of Juvenile American Shad Populations by Fin Ray and Scute Counts, by Paul R. Nichols, 13 pp., Feb. 1966.

Annual Report Exploratory Fishing and Gear Research, Bureau of Commercial Fisheries, Region 2, for Fiscal Year 1964, by Harvey R. Bullis, Jr. and John R. Thompson, Circular 236, 61 pp., illus., Jan. 1966. Includes a report of the base director, outlining the significant events in exploratory fishing which occurred during the fiscal year. Also includes a resume of accomplishments in fishery development made by the Bureau's research vessel Oregon, the Gulf of Mexico exploratory fishing and gear research program, Pascagoula; offshore gear research, photoinstrumentation, Pascagoula; off-season menhaden explorations--Gulf of Mexico, Pascagoula; Caribbean and tropical Atlantic exploratory fishing and gear research program, Pascagoula; and faunal survey program, Pascagoula. Also covers the South Atlantic exploratory fishing and gear research program, Brunswick; gear research program, Panama City, Panama; and BCF/AID Panama spiny lobster project, Panama City, Panama.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED:

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, February 1966, 13 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

List of Primary Receivers of Imported Fishery Products and Byproducts, New York, 1965, 23 pp., 1966. (U. S. Bureau of Commercial Fisheries, Market News Service, 346 Broadway, New York, N. Y. 10013.)

Middle Atlantic Fishery Trends--Monthly Summary--January 1966, 16 pp. (Market News Service, U. S. Fish and Wildlife Service, 346 Broadway, Room 1003, New York, N. Y. 10013.) Includes summaries and analyses of receipts and prices on wholesale Fulton Fish Market, including both the salt- and fresh-water sections; imports entered at New York customs district; primary wholesalers' selling prices for fresh, frozen, and selected canned fishery products; marketing trends; landings at Fulton Fish Market docks and Stonington, Conn.; and trends in the fisheries of the New Jersey and Delaware Bay areas; for the month indicated. This publication succeeds New York City's Wholesale Fishery Trends.

New England Fisheries--Monthly Summary--February 1966, 21 pp. (Market News Service, U. S. Fish and Wildlife Service, 10 Commonwealth Pier, Boston, Mass. 02210.) Review of the principal New England fishery ports. Presents data on fishery landings by ports and species; industrial fish landings and ex-vessel prices; imports; cold-storage stocks of fishery products in New England warehouses; fishery landings and ex-vessel prices for ports in Massachusetts (Boston, Gloucester, New Bedford, Provincetown, and Woods Hole), Maine (Portland and Rockland), Rhode Island (Point Judith), and Connecticut (Stonington); frozen fishery products prices

to primary wholesalers at Boston, Gloucester, and New Bedford; and Boston Fish Pier and Atlantic Avenue fishery landings and ex-vessel prices by species; for the month indicated.

Receipts of Fresh and Frozen Fishery Products at Baltimore's Wholesale Fish Market, 1965, by James A. Coyne, April 1966, 30 pp. (Fishery Market News Service, U. S. Fish and Wildlife Service, 103 South Gay Street, Baltimore, Md. 21202.) Includes arrivals of fresh and frozen fishery products receipts on the Baltimore wholesale market as reported by original receivers. Excluded are local cold-storage withdrawals, direct shipments to hotels, restaurants, and retailers, and imports entered by steamship at Baltimore. Receipts are listed by states and countries from which they were shipped. In cases where the shipping point is unknown, they are shown by the state from which they were billed.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, February 1966, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 New Federal Office Bldg. 909 First Ave., Seattle, Wash. 98104.) Includes landings by the halibut fleet reported by the Seattle Halibut Exchange; salmon fleets reported by primary receivers; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels; receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines; and ex-vessel landings; and imports from other countries through Washington customs district; for the month indicated.

Seattle, Washington, Brokers, Importers and Exporters of Fishery Products, 1966, 7 pp., 1966. (Market News Service, U. S. Fish and Wildlife Service, 706 Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.)

THE FOLLOWING SERVICE PUBLICATIONS ARE FOR SALE AND ARE AVAILABLE ONLY FROM THE SUPERINTENDENT OF DOCUMENTS, U. S. GOVERNMENT PRINTING OFFICE, WASHINGTON, D. C. 20402.

Fish, Wildlife, and Pesticides, 12 pp., illus., printed, 10 cents. Discusses many of the most commonly known pesticides and the purposes for which they are used. Reports on research by Fish and Wildlife Service scientists to assess various pesticides and to develop substitutes for those found to be most dangerous to fish and wildlife. The report also discloses that pesticides can be found virtually everywhere in the world, sometimes thousands of miles from where they were applied. It explains how groups of living organisms rate on a scale of sensitivity to pesticides and how pesticides kill or injure these organisms. It also tells how pesticides are particularly significant to the fishing industry since some of the most valuable species of fish and shellfish are among the most sensitive to pesticides.

Top O' the Mornin' with Fish and Shellfish, Test Kitchen Series No. 15, 19 pp., illus., printed, 1966, 25 cents. Nutritionists agree that one-fourth to one-third of our daily food requirements should be eaten at the morning meal; however, large groups of our population still do not take the time to eat a good

breakfast. A lack of protein in the morning meal no doubt accounts for the mid-morning letdown many experience. Researchers have found this let-down to be a characteristic aftermath of meals which are high in carbohydrates and low in high-quality proteins. Fish is a high-quality protein food abundantly supplied with vitamins and minerals; it cooks quickly and has a delicate, distinctive flavor. This booklet contains 17 "change-of-pace" eye-opener recipes developed by home economists of the Bureau of Commercial Fisheries. They will encourage your family to eat a hearty first-meal-of-the-day. Three of the recipes "Brunch for a Bunch," list ingredients for 25, 50, and 100 portions.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

AMINO ACIDS:

Articles from Chemical Abstracts, vol. 61, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006:

"Fish and fish products. IV--Evaluation of certain types of fish for their valuable constituents and essential amino acids," by M. Qudrat-i-Khuda, Kg. M. Qudusur Rahman, and N. A. Khan, July 6, 1964, Abstract No. 1178e.

"Free amino acids of marine invertebrates," by James S. Kittredge and others, June 8, 1964, Abstract No. 14882a.

ANTIBIOTICS:

Articles from Bulletin of the Japanese Society of Scientific Fisheries, printed. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-ku, Tokyo, Japan:

"Effect of metal ions upon the heat stability and antibacterial activity of Tylosin. I--Results obtained by the cylinder-plate assay method"; and "II--Results obtained by the Turbidimetric assay method," by Toshiharu Kawabata, Kimiyo Shibuya, and Takeshi Suzuki, vol. 31, May 1965, pp. 350-364.

"Heat inactivation of Tylosin included in muscle tissue and method of its prevention," by Tetuo Tomiyama and Etsuko Shiraishi, vol. 31, Apr. 1965, pp. 312-318.

"Studies on the behavior and the effect of some preservatives in fish products. I--Behavior of Tylosin in fish products on the basis of antibacterial action," by Motonobu Yokoseki, Chieko Nemoto, and Keishi Amano, vol. 30, Sept. 1964, pp. 772-777.

"Studies on food preservatives. VIII--Resistance studies on Tylosin," by Tomoaki Okitsu, Toshiharu Kawabata, and Tsuneo Kozima, vol. 31, Mar. 1965, pp. 219-226.

BIOCHEMISTRY:

"Kinetics of the reversible reaction of sperm whole myoglobin with zinc," by John R. Cann, article, Biochemistry, vol. 3, May 1964, pp. 714-722, printed. Biochemistry, Society for Experimental Biology and Medicine, 139th St. and Convent Ave., New York, N. Y. 10027.

"The oxygen equilibrium of some lamprey hemoglobins," by Eraldo Antonini and others, article, Archives of Biochemistry and Biophysics, vol. 105, May 1964, pp. 404-408, printed. Archives of Biochemistry and Biophysics, c/o Academic Press, Inc., 111 5th Ave., New York, N. Y. 10003.

BRAZIL:

"Atividade pesqueira atual no Nordeste Brasileiro" (Actual Fishing Activities in Northeast Brazil), article, Revista Nacional da Pesca, vol. 6, no. 48, January-February 1966, pp. 9-11, illus., printed. Revista Nacional da Pesca, Rua Xavier de Toledo, 210, Caixa Postal: 30.263, São Paulo, Brazil.

"La pesca en el Brasil" (Fishing in Brazil), article, Boletín de Informacion, no. 87, December 1965, pp. 17-19, printed. Sindicato Nacional de la Pesca, Paseo del Prado, 18-20, Madrid, Spain.

CALIFORNIA:

California Fish and Game, vol. 52, no. 1, Jan. 1966, 64 pp., illus., printed, single copy \$0.75. Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807. Some of the articles are: "Length frequencies of Pacific hake (Merluccius productus) landed in California through 1964," by E. A. Best and R. J. Nitsos; and "A Greenland halibut, Reinhardtius hippoglossoides (Walbaum) recorded on Southern California," by Jack W. Schott.

The California Marine Fish Catch for 1964, by Edward C. Greenhood and David J. Mackett, Fish Bulletin 132, 45 pp., printed. California Department of Fish and Game, Office of Procurement, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807.

Fish and Game Code, 1965, 299 pp., printed, 1965. California Department of Fish and Game, Documents Section, P. O. Box 1612, Sacramento, Calif. 95807. Provisions of this code relate to the taking, processing, or use of birds, mammals, fish, mollusks, crustaceans, etc. The section pertaining to commercial fishing covers licensing, vessel registration, etc.; particular varieties of fish such as sardines, anchovies, salmon, lobster, crab, abalones, clams and other mollusks, salt-water and anadromous fish, and fresh-water fish. It also covers nets for particular varieties of fish, and other means of taking fish. Inside the back cover are the hunting and angling regulations for 1965, adopted by the Commission under its regulatory powers.

Natural Resources of California, 84 pp., illus., printed, 60 cents. U. S. Department of the Interior, Office of the Secretary, Office of Information, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.)

Ocean Fishing, 4 pp., illus., printed, 1965. State of California Resources Agency, Department of Fish and Game, 1416 Ninth St., Sacramento, Calif. 95814.

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CLAMS:

"Larval development of the brackish water macretid clam, Rangia cuneata," by Paul Chanley, article, Chesapeake Science, vol. 6, no. 4, Dec. 1965, pp. 209-213, illus., printed, single copy 75 cents. Natural Resources Institute of the University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. 20688.

"Temperature dependence of the activity of the anti-tumor factor in the common clam," by Andrew Hegyeli, article, Science, vol. 146, Oct. 2, 1964, p. 77-78, printed. Science, American Association for the Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

COD:

Articles from Journal of the Fisheries Research Board of Canada, vol. 22, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada:

"Lysolecithinase of cod muscle," by M. Yurkowski and H. Brockerhoff, May 1965, pp. 643-652.

"Studies on the quality of Newfoundland cod. 10--Effect of some commercial freezing rates on the frozen and stored quality of trap cod," by W. A. MacCallum, Dorothy A. Chalker, and E. J. Laishley, March 1965, pp. 411-420; 11--Thaw-drip polyphosphate-treated and untreated fillets," by Dorothy A. Chalker and W. A. MacCallum, May 1965, pp. 783-791.

"Trends in catch, age, and size of cod from the commercial longline fishery at Bonavista, Newfoundland, 1952-62," by A. M. Fleming, March 1965, pp. 465-474.

COMMISSIONS:

Gulf States Marine Fisheries Commission Sixteenth Annual Report, 1964-1965 (to the Congress of the United States and to the Governor and Legislators of Alabama, Florida, Louisiana, Mississippi, and Texas), 47 pp., illus., printed, limited distribution. Gulf States Marine Fisheries Commission, 312 Audubon Bldg., New Orleans, La. 70112. Outlines the Commission's activities for the period October 1964-October 1965, with a summary of actions and recommendations. Describes briefly the activities of each of the member States during that period. Includes short discussions of U. S. Fish and Wildlife Service activities in shellfish, menhaden, bottomfish, and pelagic fish exploration; offshore gear research; faunal survey; shrimp biology, shrimp dynamics, and experimental biology; estuarine studies; pesticides; red tide program; biochemical studies of shrimp; microbiology; seafood inspection and certification; marketing; Federal aid to States; and financial assistance to the commercial fishing industry. Also contains the financial report of the Commission for the year ended June 30, 1965.

16th and 17th Annual Reports of the Pacific Marine Fisheries Commission for the Years 1963 and 1964 (to the Congress of the United States and to the Governors and Legislatures of Washington, Oregon, California, and Idaho), 62 pp., illus., printed, April 1965. Pacific Marine Fisheries Commission, 741 State Office Bldg., 1400 SW. Fifth Ave., Portland,

Oreg. 97201. Reports briefly on the specific activities of the Pacific Marine Fisheries Commission during 1963 and 1964 and presents a review of developments in the fields of research, regulation, and coordination in the States of Washington, Oregon, California, and the new member Idaho. Reviews Commission activities during 1963, a few of which are: action on the exploitation by foreign fishing vessels, taking salmon on high seas, shrimp problem between Oregon and California, salmon spawning sanctuaries, power dam moratorium, Indian affairs, pesticide program and other topics. Also reviews Commission activities of 1964, among which are: permanent protection area for anadromous fish in the Salmon River, Idaho; oysters--causes of mortality; shrimp research; and tariff on imported fish regarding international North Pacific Treaty.

CONSUMER PRICE INDEX:

Measuring Prices: An Inexact Science, by Arthur M. Ross, 2 pp., printed. (Reprinted from The Wall Street Journal, Thursday, Feb. 10, 1966.) U. S. Department of Labor, Bureau of Labor Statistics, Washington, D. C. 20210.

CRABS:

"Hemolymph calcium fluctuations as related to environmental salinity during ecdysis of the blue crab, Callinectes sapidus," by Paul A. Haefner, Jr., article, Chemical Abstracts, vol. 61, Oct. 26, 1964, Abstract No. 11071e, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Record crab yield paves way for vigorous market push," by Duane D. Shelton, article, Quick Frozen Foods, vol. 17, Mar. 1965, pp. 85-89, printed. Quick Frozen Foods, 1776 Broadway, New York, N. Y. 10019.

"A study of the hatching process in aquatic invertebrates. XX--The blue crab, Callinectes sapidus, Rathbun; XXI--The nemertean, Carcinonemertes carcinophila (Kölliker)," by Charles C. Davis, article, Chesapeake Science, vol. 6, no. 4, Dec. 1965, pp. 201-208, illus., printed, single copy 75 cents. Natural Resources Institute of the University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. 20688.

CUBA:

"Nuevos horizontes en la pesca del bonito" (New Horizons in Bonito Fishing), article, Mar y Pesca, vol. 6, March 1966, pp. 4-11, illus., printed. Instituto Nacional de la Pesca, Amargura 103, Havana, Cuba.

CZECHOSLOVAKIA:

Articles from Bulletin, vol. 1, no. 3, July-September 1965, printed in Czech. Fisheries Research Institute, Vodnan, Czechoslovakia:

"Further new experiences on the use of antibiotics in our fishery," by Josef Havelka and Frantisek Volf, pp. 12-20.

"Application of herbicides for the killing of aquatic plants," by Miroslav Vejvoda, pp. 21-27.

"The newly built experimental ponds of Fisheries Research Institute as a base for solving research tasks," by Rudolf Berka and Emanuel Eliasek, pp. 33-35.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

DOGFISH:

Occurrence of Spiny Dogfish (*Squalus acanthias*), and Other Elasmobranchs in South Carolina Coastal Waters, 1 pp., printed. (Reprinted from *Copeia*, no. 3, Sept. 30, 1965, p. 378.) American Society of Ichthyologists and Herpetologists, 18111 Nordhoff St., Northridge, Calif. 91324.

ECOLOGY:

Articles from *Ecology*, vol. 46, no. 6, Autumn 1965, illus., printed. Duke University Press, P. O. Box 6697 College Station, Durham, North Carolina 27708:

"Vertical zonation of inshore fishes in the upper water layers of the Hawaiian Islands," by William A. Gosline, pp. 823-831.

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Martin Roessler, Contribution No. 594, 8 pp., printed. (Reprinted from *Transactions of the American Fisheries Society*, vol. 94, no. 4, Oct. 1965, pp. 311-318.) The Marine Laboratory, Institute of Marine Science, University of Miami, Miami, Fla. 33124.

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trip of the FFS "Anton Dohrn" to Labrador and West Greenland); "Überblick über die deutsche Heringsfischerei 1964" (Review of the German Herring Fishery 1964); "Neue Ergebnisse aus der internationalen Forschung über den Roten Thun" (New Findings from the International Research on Red Tuna); and "Methoden der Qualitätsbeurteilung tiefgefrorener Fischerzeugnisse" (Methods of Determining Quality of Deep Frozen Fishery Products).

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Radiation Processing of Foods (Hearings before the Subcommittee on Research, Development, and Radiation of the Joint Committee on Atomic Energy, Congress of the United States, Eighty-Ninth Congress, 1st session, June 9 and 10, 1965), 826 pp., illus., printed, \$2.50. The Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Contents include statements and correspondence from various Federal Officials, doctors, and representatives of business firms. It includes, among others, a report on "Marketing feasibility study of radiation processed fishery products"; and "Irradiation nears reality--pilot plant will pioneer processing, shipping, and marketing of irradiated seafoods." Fish meal is included in the study of the economics of controlling *Salmonellae* in foods by the use of ionizing radiation.

"Studies on food irradiation in Japan," article, Food Irradiation Quarterly, vol. 5, no. 3, January-March 1965, pp. A8-A11, printed. Centre Europeen d'Information pour l'Irradiation des Aliments, B. P. No. 6, Gid-sur-Yvette (S.-et-O), France. (For sale by O.E.C.D. Mission, Suite 1223, 1346 Connecticut Ave. NW., Washington, D. C. 20006.)

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"A preliminary annotated list of the lampreys and fishes of Illinois," by Philip W. Smith, article, Illinois Natural History Survey Biological Notes, vol. 54, 1965, pp. 1-12, illus., map, printed. Illinois Natural History Survey, Natural Resources Bldg., Urbana, Ill. 61801

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location. The authors stress, though, that much research is still needed both on this subject of intelligence and on the habits of cetaceans and seals. The references at the end of the book give an extensive list of current, as well as standard books and articles to which the student may refer.

MARINE BIOLOGY:

A Biological Investigation of the Caloosahatchee Estuary of Florida, by Gordon Gunter, Gulf Research Report, vol. 2, no. 1, 72 pp., illus., printed, Dec. 1965. Gulf Coast Research Laboratory, Ocean Springs, Miss.

MARKETING:

Small Marketers Aids--Annual No. 7, edited by Jean B. MacArthur, 100 pp., 1965, printed, 40 cents. Small Business Administration, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) Contains a series of 12 Aids published during 1962. Advises the small businessman how to deal with all aspects of running a small merchandising operation. It also discusses buying habits of customers, motivation research, building the right reputation, installment selling, advertising, etc.

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"Mineral content of fish. Studies of minerals (NA, K, CA, P, MG) in fish and their importance in the diet of healthy and sick people," by J. G. Rausch-Stroumann and M. Breckwoldt, article, Chemical Abstracts, vol. 61, Dec. 21, 1964, Abstract No. 16703a, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

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Annual Report of the Division of Fish and Game, 62 pp., printed. Department of Conservation and Economic Development, Division of Fish and Game, Trenton, New Jersey. Contains, among others, summary of activities of "Bureau of fisheries management, freshwater research and development section."

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Oceanography and Underwater Sound for Naval Applications, Special Publication 84, 145 pp., illus., processed, 75 cents, 1965.

Wave Hindcast Project North Atlantic Ocean, by Donald C. Bunting, TR-183, 43 pp., processed, 75 cents, Jan. 1966.

Annual Report of Oceanographic Observations, vol. 13, 1964, 222 pp., illus., printed, February 1965. Fisheries Research and Development Agency, The Republic of Korea, Pusan, Korea.

Proceedings of the National Conference on the Concept of a Sea-Grant University, 96 pp., printed, Oct. 28 and 29, 1965, US\$4.00. Graduate School of Oceanography, University of Rhode Island, Kingston, R. I. 02881. Contains the speeches, panel discussions, and other proceedings of the National Conference on the "Concept of a Sea-Grant University."

"U. S. needs new oceanography program," by James H. Wakelin, Jr., article, Chemical and Engineering News, vol. 43, June 21, 1965, p. 21, printed. Chemical and Engineering News, McGraw Hill Publishing Co., 330 W. 42nd St., New York, N. Y. 10036.

University Curricula in Oceanography, Academic Year 1965-66, ICO Pamphlet No. 23, 118 pp., processed, Dec. 1965. Interagency Committee on Oceanography, Bldg. 159E, Washington Navy Yard, Washington, D. C. 20390. This catalog is a compilation of courses offered in the marine sciences at accredited American colleges and universities. In addition to providing information for students, its purpose is to increase the exchange of information among the schools, and between them and employers of oceanographic manpower. Courses described are not restricted to those designated as "oceanography" by the institutions offering them, but include all courses dealing with the study of marine environment. Undergraduate curricula include marine biology, oceanography, fisheries, and marine geology. It also includes information on noninstitutional financial aid programs.

OCEAN PERCH:

"Redfish," by E. J. Sandeman, article, Trade News, vol. 18, no. 8, February 1966, pp. 19-21, illus., printed. Department of Fisheries, Ottawa, Canada.

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Know Your Oklahoma Fishes, by Hubert C. Ward, 40 pp., illus., printed. Oklahoma Department of Wildlife Conservation, Oklahoma City, Okla. Describes and illustrates 16 of the known fish families in Oklahoma and about one-third of the species. A brief discussion of each species is also included.

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Gonad Development and Discharge of Spawn in Oysters of Long Island Sound, by Victor L. Loosanoff, 17 pp., illus., printed. (Reprinted from Biological Bulletin, vol. 129, no. 3, Dec. 1965, pp. 546-561.) The Biological Bulletin, The Marine Biological Laboratory, Woods Hole, Mass. 02543.

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"Ecological studies related to plankton productivity in two Chesapeake Bay estuaries," by R. W. Ward and others, article, Chesapeake Science, vol. 6, no. 4, Dec. 1965, pp. 214-225, illus., printed, single copy 75 cents. Natural Resources Institute of the University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. 20688.

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"The West Greenland Salmon Fishery," by Richard L. Saunders, article, Trade News, vol. 18, no. 8, February 1966, pp. 3-6, illus., printed. Information and Educational Service, Department of Fisheries, Ottawa, Canada.

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"Orange-red meats in sea scallops," by Neil Bourne and E. G. Bligh, article, Journal of the Fisheries Research Board of Canada, vol. 22, May 1965, pp. 861-864, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.

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"Sharks of the central Gulf Coast of Florida," by Eugenie Clark and Katherine von Schmidt, article, Bulletin of Marine Science, vol. 15, no. 1, 1965, pp. 13-83, printed, single copy \$3.50. Marine Laboratory, University of Miami, #1 Rickenbacker Causeway, Miami, Fla. 33149.

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"Electrical threshold responses of pink shrimp Penaeus duorarum, Burkenroad," by Doyné W. Kessler, article, Bulletin of Marine Science, vol. 15, no. 4, Dec. 1965, pp. 885-895, illus., printed, single copy \$3.50. Institute of Marine Science, University of Miami, 1 Rickenbacker Causeway, Virginia Key, Miami, Fla. 33149.

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Management Aids for Small Manufacturers--Annual No. 11, edited by Jean B. MacArthur, 107 pp., 1965, printed, 40 cents. Small Business Administration, Washington, D. C. (For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402.) A series of 12 Aids published during the year ending June 30, 1963, and 4 Aids published in October 1961. Contains advice of experts from all over the country and in every area of business management, specifically gathered and developed for owners and managers of small businesses.

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"Persistence of the native rainbow trout type following introduction of hatchery trout," by Richard Gard and Donald W. Seegrist, article, Copeia, no. 2, 1965, pp. 182-185, printed. Copeia, American Society of Ichthyologists and Herpetologists, 1811 Nordhoff St., Northridge, Calif. 91324.

"Rainbow trout culture in Japan," by Y. Yoshioka, article, U. S. Trout News, vol. 10, no. 4, Nov.-Dec. 1965, pp. 12, 14, 15, and 19, illus., printed. U. S. Trout Farmers Association, 67 W. 9000 South, Sandy, Utah 84070.

"Some effects of environment on egg production in brown trout (*Salmo trutta*)," by James T. McFadden, Edwin L. Cooper, and John K. Andersen, article, Limnology and Oceanography, vol. 10, no. 1, 1965, pp. 88-95, printed. Limnology and Oceanography, K. M. Rae, c/o George H. Lauss, University of Michigan, Ann Arbor, Mich.

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"A report on the survey of tuna," by A. G. York, article, Commercial Fishing, vol. 3, March 1965, pp. 31, 33-34, printed. Trade Publications Ltd., 26 Albert Street, Auckland, New Zealand.

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U. S. S. R.:

Japanese-Soviet Fisheries Technical Cooperation Data Subcommittee Leaflets, printed in Japanese, Dec. 1965. Japan Fisheries Association, Tokyo, Japan:

No. 1 - Data on the Present Status of Soviet Fisheries, 39 pp.

No. 2 - (A) Data on Soviet 7-Year Fisheries Plan and on Next 5-Year Fisheries Plan; (B) Structure and Capacities of Large-Sized Trawlers, 98 pp., illus.

Prakticheskoe rukovodstvo po bor'be s vrediteliami rybnikh produktov (Practical Guidance in the Control of Pests Harmful to Fishery Products), by S. A. Dorokhov, 92 pp., printed in Russian, 1965. Izd-vo 'Pishchevaia Promyshlennost', Moscow, U. S. S. R. The booklet describes modern methods to control insects (flies, beetles, moths), rodents, and other harmful pests in processing fishery products.

"Razvedenie rakov v mestnykh vodoemakh" (Breeding crayfish in local water reservoirs), by S. Brodskii, article, Rybovodstvo i Rybolovstvo, vol. 5, 1959, pp. 25-26. Ministerstvo Sel'skogo Khoziaistva SSSR, Moskva, U. S. S. R.

UNITED KINGDOM:

"Fillets or Whole Fish?" article, World Fishing, vol. 15, no. 2, February 1966, pp. 25-27, 31, illus., printed, single copy 3s. 6d. (about 50 U.S. cents). Grampian Press Ltd., The Tower, 229-243, Shepherd's Brush Road, Hammersmith, London, W. 6, England. With two new British freezer stern trawlers fitted out for filleting and in commission and more on the way, it seems that Britain may soon follow Germany in the production of sea-frozen fillets by the medium stern trawler. Since this possibility was last considered in World Fishing (January 1962), the practicability of this system has moved closer, though certain problems are not yet fully solved. The article draws on expert opinion to define and discuss these problems as they stand today.

VESSELS:

"Economics of outboard motors in small fishing crafts in Saurashtra (India)," by K. Chidambaram, article, Current Affairs Bulletin, vol. 41, no. 1, December 1964, pp. 8-13, printed. Indo-Pacific Fisheries Council, Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Far East, Maliwan Mansion, Phra Atit Road, Bangkok, Thailand.

VIRGINIA:

Sixty-sixth and Sixty-seventh Annual Reports of the Commission of Fisheries of Virginia (for the Fiscal Year Ending June 30, 1964 and June 30, 1965), 40 pp., illus., printed, 1965. Virginia Commission of Fisheries, Newport News, Va. A summary of the functions and operations of the Commission. Shows the amount of revenue derived from the fish and

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shellfish industries and royalties, all the expenditures of the Commission, and the general condition of the fish and shellfish industries under the supervision of the Commission. Discusses enforcement and personnel, working of the engineering department, Potomac River activities, fishery statistical collection, and oyster research. Also covers accomplishments by the Commission in conservation and rehabilitation, pollution control, and James River study. Statistical tables present data showing

receipts from the fish and oyster industry by districts; recorded oyster planting grounds; and other related information.

WHITEFISH:

"Candling for the detection of triaenophorus crassus cysts in whitefish," by W. Budde, article, *Journal of the Fisheries Research Board of Canada*, vol. 22, May 1965, pp. 865-867, printed. Queen's Printer and Controller of Stationery, Ottawa, Canada.



RADIATION PRESERVATION OF FOOD IS GAINING

The preservation of food by ionizing radiation "is fast approaching commercialization," and within the decade, irradiation will be recognized as a major technique for preservation, the U. S. Department of Commerce said on June 1, 1965.

These conclusions were presented in a report--"Current Status and Commercial Prospects for Radiation Preservation of Food," prepared by the Food Irradiation Unit in the Office of Chemicals and Consumer Products of the Department's Business and Defense Services Administration (BDSA). The BDSA is a member of a 10-member interagency group dealing with radiation preservation of food. The report was prepared under contract for the Atomic Energy Commission, another member.

The report explains that the Food and Drug Administration has cleared radiation-treated bacon, wheat and wheat products, and potatoes for human consumption, as well as a number of packaging materials for use in connection with irradiated foods. Other petitions for clearance are pending or in preparation.

Of the 28 products considered in the study in connection with 6 different irradiation processes, 17 were found to have either "good" or "excellent" prospects for domestic or international markets.

Those products for which radiation is believed to hold the most promise at this time are: pasteurized poultry, marine products, and strawberries; sterilized poultry and ham; improved dehydrated vegetables; and disinfected eggs, liquid, frozen, and dried.

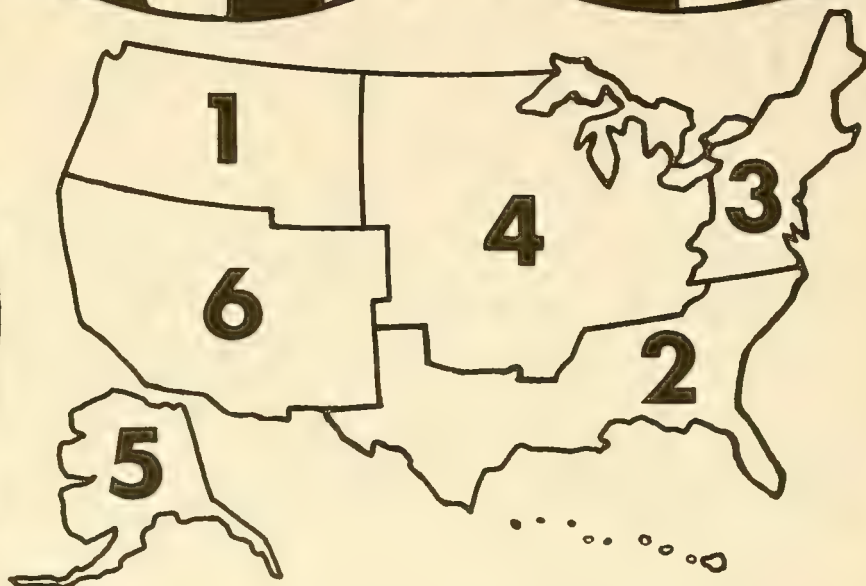
The study also identifies the direction and magnitude of possible changes or problems which may affect segments of the economy concerned with food processing, as adoption of the radiation technique increases.

It also includes an analysis and discussion of international aspects, Government regulation, consumer reaction, and other factors.

The report says that major benefits of this new method of food preservation will be felt in areas not reached by other processes. In some instances, it is expected to replace present methods of preservation, and elsewhere, to be used in combination with other processes.

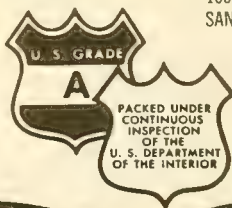
The benefits anticipated include elimination of food-borne hazards to health; the availability of new and more convenient foods; improvement in quality; savings from reductions in spoilage; and market expansion as the result of extensions of shelf life and shipping distances.

Note: "Current Status and Commercial Prospective for Radiation Preservation of Food" is for sale by the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Price 55 cents.



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prepared in the BUREAU OF COMMERCIAL FISHERIES.

Joseph Pileggi, Editor

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5/31/68

CONTENTS

COVER: The research vessel Hernan Cortez (built in 1964) of the Florida Board of Conservation is a conventional, double-rigged shrimp trawler. The double-rig deck arrangement permits dragging a single net from either side or two nets simultaneously. She participated (with the U. S. Bureau of Commercial Fisheries) in a survey of the trawl-fish potential off the Florida west coast to determine the species composition, distribution, relative abundance, and availability of bottomfish to trawling gear. (See p. 1 of this issue.)

Page	
1	Experimental Fish Trawling Survey Along the Florida West Coast, by Rolf Juhl

Page	TRENDS AND DEVELOPMENTS:
	Alaska:
6	USDI Inspection of Herring-Eggs-on-Kelp
6	Peelability of Fresh Pink Shrimp Discussed
	Alaska Fishery Investigations:
6	Earlier Red Salmon Eggs Require the Most Thermal Units
7	Spawning Channel Pink Fry Survival Encouraging
7	Shrimp Behavior Studies Continued
	American Samoa:
7	Tuna Fleet Status, January 1966
	California:
7	Experimental Anchovy Fishery as of April 20, 1966
8	Anchovy Tagging Program Conducted
8	Cans--Shipments for Fishery Products, January 1966

Page	TRENDS AND DEVELOPMENTS (Contd.):
	Central Pacific Fisheries Investigations:
8	Huge Skipjack Tuna Potential Seen
9	Oceanographic Research Project Conducted South of the Hawaiian Islands
10	Trade Wind Zone Oceanographic Studies Continued
11	Tuna Biological Studies Continued
	Chesapeake Bay:
12	Radioactive Wastes in Bottom Deposits Studied
	Columbia River:
13	"Operation Coho" Launched as Part of Hatchery Evaluation Study
13	Clarification Sought on Indian Commercial Fishery
	Federal Purchases of Fishery Products:
14	Department of Defense Purchases, February 1966

Contents continued page II.

CONTENTS (CONTINUED)

Page		Page	
	TRENDS AND DEVELOPMENT (Contd.):		TRENDS AND DEVELOPMENTS (Contd.):
	Federal Purchases of Fishery Products (Contd.):		Shrimp:
15 ..	Veterans Administration Requirements for 1966	31 ..	U. S. Consumption in 1965
	Fish Farming:		South Carolina:
15 ..	Pond-Reared Catfish Has Food Market Potential	32 ..	Fisheries Biological Research Progress, January-March 1966
	Fish Protein Concentrate:		Tuna:
16 ..	Legislative Authority to Build Large-Scale Plant Recommended by Interior Department	34 ..	Economic Study of Tuna Fishing by U. S. Bureau of Commercial Fisheries
	Fur Seals:		United States Fisheries:
17 ..	Prices for Alaska Skins at Spring 1966 Auction	34 ..	Fish Consumption in 1965 Highest in Ten Years
	Great Lakes:	35 ..	1963 Census of Commercial Fisheries
17 ..	Michigan's First Plantings of Silver Salmon	35 ..	Landings and Value of Commercial Fisheries Higher in 1965
	Great Lakes Fisheries Explorations and Gear Development:		U. S. Fishing Vessels:
18 ..	Alewife Spawning Migrations Studied	36 ..	Fisheries Loan Fund and Other Financial Aid for Vessels, January 1-March 31, 1966
	Gulf Fishery Investigations:	37 ..	Documentations Issued and Cancelled, Year 1965
19 ..	Shrimp Biology Program		U. S. Foreign Trade:
19 ..	Estuarine Program	38 ..	Imports of Canned Tuna in Brine Under Quota
20 ..	Experimental Biology Program		Washington:
	Industrial Fishery Products:	38 ..	Salmon Fishing Regulations for 1966 in Grays and Willapa Harbors Proposed
20 ..	U. S. Fish Meal Supplies in 1965 and Early 1966	38 ..	Salmon Fishing Regulations for Puget Sound in 1966 Adopted
	U. S. Fish Meal, Oil, and Solubles:		Wholesale Prices:
21 ..	Production by Areas, March 1966	39 ..	Edible Fish and Shellfish, April 1966
21 ..	Production, February 1966		FOREIGN:
	U. S. Fish Meal and Solubles:		International:
22 ..	Production and Imports, January-February 1966		Fish Meal:
22 ..	Scientists Study Why Fish Oils Become Rancid	41 ..	World Production, 1965 and January-February 1966 with Comparisons
	Maine Sardines:	41 ..	Production and Exports for Selected Countries, 1965 and January 1966
23 ..	Progress in Long Range Predictions of Herring Supply		Food and Agriculture Organization:
	National Fisheries Institute:	41 ..	World Trade in Fishery Products, 1964
23 ..	Expanded Promotional Program Planned for 1966 "Fish 'n Seafood Parade"		Fresh-Water Fish:
	Nautical Charts:	45 ..	IBP Technical Meeting on the Biological Basis of Fresh-Water Fish Production
24 ..	List for Pacific Coastal Waters		Herring:
	North Atlantic Fisheries Investigations:	45 ..	Herring Research in Norwegian Sea
25 ..	Distribution of Larval Herring in Gulf of Maine Studied		General Agreement on Tariffs and Trade:
	North Pacific Fisheries Explorations and Gear Development:	45 ..	Twenty-Third Session Held in Geneva
25 ..	Hake Population Survey Continued		Inter-American Tropical Tuna Commission:
	Oceanography:	46 ..	Annual Meeting Held in Guayaquil, Ecuador
26 ..	New Research Vessel <u>Oceanographer</u> Delivered to Government		Law of the Sea:
27 ..	New Hydrographic Vessel Launched for U. S. Coast and Geodetic Survey	47 ..	Convention on Fishing and Conservation of the Living Resources of the High Seas Enters into Force
	Oregon:	47 ..	Conference Held at University of Rhode Island
27 ..	Steelhead Stocking Program		North Sea Continental Shelf:
28 ..	Willamette Falls Steelhead Count High	48 ..	Agreement Between Britain and Denmark
29 ..	Indian Fishery in Columbia River Surveyed		Northwest Pacific Fisheries Commission:
29 ..	Salmon Hatchery Construction Contract Awarded	48 ..	Report on Tenth Meeting Between Japan and U.S.S.R.
	Rhode Island:		Organization for Economic Cooperation and Development:
29 ..	Fishery Landings, 1965		Fisheries Committee Meeting
30 ..	Marine Experiment Station to be Established by University of Rhode Island		Salmon:
	Salmon:	50 ..	United States-Canadian Pacific Salmon Conference
30 ..	U. S. Pacific Coast Canned Stocks, March 1, 1966		Fishing Vessels:
	Shellfish Farming:	52 ..	World Construction Data
31 ..	Potential Along U. S. East Coast		

CONTENTS (CONTINUED)

Page	FOREIGN (Contd.):	Page	FOREIGN (Contd.):
	Aden:		India:
53 ..	Fishery Trends in 1965 and Outlook for 1966	70 ..	Expansion of Shrimp Exports to the United States
	Angola:	70 ..	Fishing Chart of India's West Coast to be Published by Norway
53 ..	Government Regulations Discourage South-African Fishing Firms in Angola	70 ..	Fresh-Water Fisheries Development
	Australia:		Ireland:
53 ..	Tuna Season Short in New South Wales	70 ..	Fisheries Expansion in 1965
	Brazil:		Ivory Coast:
53 ..	Packing Firm Starts Fishing Fleet	71 ..	Developments in Tuna Fisheries
	Canada:		Japan:
53 ..	Catch Expansion Forecast at Atlantic Off-shore Fishing Vessel Conference, by E. A. Schaefers	71 ..	Tuna Prices Decline
55 ..	Processing Complex on Gaspe Peninsula Planned	71 ..	Export Quotas for Frozen Tuna, 1966/67
55 ..	Fishery Landings, 1965	72 ..	Canned Tuna Export Plans of Trading Firms
56 ..	Government to Help Fishing Industry Repair Newfoundland Storm Damage	72 ..	Frozen Tuna Exports to U. S. and Puerto Rico, January 1966
56 ..	Quebec's Maritime Fisheries, 1965	72 ..	Export Price of Canned Tuna in Brine to United States
57 ..	Program to Improve Fish Handling at Sea	73 ..	Frozen Swordfish Export Validations to U. S. and Canada, April 1965-January 1966
57 ..	Pumps to Unload Salmon Developed in British Columbia	73 ..	Exports of Frozen Rainbow Trout, January 1966
59 ..	Bulk Handling of Herring Meal Tested in British Columbia	73 ..	Exports of Marine Products, November 1965
	Chile:	74 ..	Japan-Communist China (Private) Fisheries Agreement
59 ..	Reappearance of Anchovy Prevents Closure of Fish Meal Plant	74 ..	South Georgia Island Whaling Operation to Cease
59 ..	Inauguration of Anchovy Conservation		Mauritania:
	Colombia:	75 ..	Fisheries Developments
59 ..	Japanese Tuna Enterprise Fails to Materialize		Mexico:
	Cuba:	75 ..	Shrimp Fishery of Ciudad del Carmen
59 ..	Additions to Cuban Fishing Fleet	76 ..	Trend Is Toward Increased Nationalization of Fisheries
60 ..	Fishery Landings in 1965		Morocco:
60 ..	Havana Fishing Port	76 ..	Shrimp Shortage in Tangier
60 ..	Imports of Moroccan Fish Meal	77 ..	Sardine Fleet Recovers from Storm Damage
60 ..	Servicing of Soviet Fishing Vessels	77 ..	Tangier Sardine and Tuna Canning Season
60 ..	Shellfish Exports to France	78 ..	New Fish Complex Planned
	Denmark:	78 ..	Agar-Agar Plant to Move from Tangier
60 ..	Fishery Landings, Prices, Processing, and Foreign Trade in 1965 and Outlook for 1966		Mozambique:
67 ..	Fish Meal, Oil, and Solubles Production and Exports, February 1966	78 ..	Fisheries Production, 1961-1965
67 ..	Small Fish Meal Plant for Research Use Developed		Netherlands:
67 ..	Sealskins from Greenland Auctioned	78 ..	Fishery Landings, 1964-1965
	Ecuador:		Nigeria:
68 ..	Law on Foreign Fish Landings	79 ..	New Shrimp Fishing Enterprise Formed
	East Germany:	80 ..	Frozen Fish Marketing and Distribution
68 ..	Fishing Vessels Sold to Danish and Swedish Firms		Norway:
	Greece:	81 ..	Herring and Cod Fishery Trends, March 19, 1966
68 ..	Fishery Landings and Trends, 1965	81 ..	Ban on Foreign Fishery Landings May Be Relaxed
68 ..	Frozen Fish Imports Banned	81 ..	Whaling Factoryship May Be Shifted to Herring Fishery
	Guinea:		Pakistan:
68 ..	Fishery Aid by Soviets	81 ..	12-Mile Fishing Limits Declared with Rights to Extended "Conservation Zones"
	Iceland:		Panama:
68 ..	Export Stocks of Principal Fishery Products, February 28, 1966	81 ..	Interest in Developing the Fish Meal Industry Increases
69 ..	Exports of Fishery Products, 1964-65	82 ..	Shrimp Catch and Exports, 1965
69 ..	Fishery Landings by Principal Species, January-October 1965		Peru:
69 ..	Utilization of Fishery Landings, January-October 1965	82 ..	Fish Meal and Oil Situation, March 1966
69 ..	Trade Agreements with East European Communist Countries		Poland:
		82 ..	Fishery Aid to Syria
			Portugal:
		82 ..	Canned Fish Exports, 1965

Contents continued page IV.

CONTENTS (CONTINUED)

Page		Page	
	FOREIGN (Contd.):		FOREIGN (Contd.):
	Portugal (Contd.):		U. S. S. R. (Contd.):
83 ..	Canned Fish Pack, 1965	93 ..	Fisheries Minister to Visit Japan
83 ..	Modern Vessel Joins Cod Fleet	93 ..	Patrol Vessels Order Japanese Trawlers from Fishing Area
	South Africa:		United Arab Republic:
83 ..	Pelagic Shoal Fish Catch Up in 1965	94 ..	Soviet Fish Landings Drop Off
	South Africa Republic:		United Kingdom:
84 ..	Hake Finds Good Market in Great Britain	94 ..	Fishery Loan Interest Rates Revised
84 ..	Record Whaling Season in 1965	94 ..	Soviet Frozen Herring Quality Dispute
	South-West Africa:	94 ..	Large Freezer-Trawler Cassio Launched
85 ..	Boat Owners Request Increase in Pilchard Price	95 ..	Supply Situation for Frozen Processed Groundfish Products, July-September 1964- 1965
	Spain:	95 ..	Foreign Fishing Off U. S. Coasts, April 1966
86 ..	Signals Used by Pair Trawlers in Northwest Atlantic		FEDERAL ACTIONS:
	Taiwan:		Department of the Interior:
86 ..	Fisheries Development Trends		Commercial Fisheries Research and Devel- opment Act:
88 ..	To Buy Fishing Vessels	100 ..	Federal Aid for Fishery Projects
	Togo:		Fish and Wildlife Service:
88 ..	Receives Fishing Vessel from West Germany		Bureau of Commercial Fisheries:
	Tunisia:	101 ..	Hearings on Applications for Fishing Ves- sel Construction Differential Subsidy
88 ..	Five Fishing Vessels from East Germany	101 ..	Applications for Fishing Vessel Loans
88 ..	U. S. S. R.:	102 ..	Requirements Adopted for Condition of Coating of U. S. Standards for Grades of Frozen Raw Breaded Shrimp
	Pacific Scallop Production and Exports to U. S.	103 ..	Proposed Regulations for Eastern Pacific Tuna Fisheries
89 ..	Fish Production Costs		U. S. Tariff Commission:
89 ..	Expansion of Pacific Fisheries	108 ..	Hearing on Import Duties for Certain Prod- ucts Including Canned Clams
89 ..	Pacific Ocean Perch Catch by Large Stern Factory Trawler		Department of the Treasury:
90 ..	Ocean Perch Fishery Off Pribilof Islands		Bureau of Customs:
90 ..	Shrimp Catch in the Gulf of Alaska	108 ..	Tuna Canned in Brine Import Quota for 1966
90 ..	Sealing Operations Begin in Pacific	108 ..	Inquiry Instituted on Fishery Products Im- ported from U.S.S.R.
90 ..	Whaling Begins in the North Pacific	109 ..	Eighty-Ninth Congress (Second Session)
90 ..	Expansion of Fishing Fleet		RECENT FISHERY PUBLICATIONS:
91 ..	Additions to Pacific Fleet	113 ..	Fish and Wildlife Service Publications
91 ..	Freezer-Trawler <u>Priluki</u> Delivered to So- viets by Danish Shipyard	115 ..	Miscellaneous Publications
91 ..	Experimental Catamaran Trawler		
91 ..	Northwest Atlantic Fishery Research		
92 ..	Fishery and Oceanographic Studies of the Pacific Ocean		
93 ..	Research in the Indian Ocean		
93 ..	Study of Fish Reaction to Sound		



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EXPERIMENTAL FISH TRAWLING SURVEY ALONG THE FLORIDA WEST COAST

By Rolf Juhl*

ABSTRACT

At the request of industry, the U. S. Bureau of Commercial Fisheries and the Florida Board of Conservation made a bottomfish trawl survey along the west coast of Florida from April to July 1965. The main objective was to assess the trawl-fish potential of the area. Modified New England roller-rigged trawls 30 and 39 feet each were fished from the R/V Hernan Cortez. Although not conclusive, results from the 213 trawl stations did not show commercial concentrations of marketable bottomfish. Information on the gear used, catch composition, distribution, and station log data is included in the report.

INTRODUCTION

The fishing industry of the west coast of Florida depends on gill-net and hand-line fisheries for market fish. Gill nets are used mostly during the winter and spring, and hand lines throughout the year. During the summer an acute shortage of marketable fish forces many processors to cease operations for 3 to 4 months. At the request of several processors, the trawl-fish potential of the Florida west coast was surveyed during April to July 1965. The survey was a cooperative effort of the U.S. Department of the Interior's Bureau of Commercial Fisheries and the Division of Salt Water Fisheries, Florida Board of Conservation. Robert Ingle, Director of Research, Florida Board of Conservation, cooperated in the arrangements for use of the vessel, project objectives, and plans. The main aims of the survey were to determine the species composition, distribution, relative abundance, and availability to trawling gear of the bottomfish fauna in the 5- to 50-fathom depths between Panama City and Dry Tortugas. Field work was performed from April 29 to July 11, 1965.

VESSEL MATERIALS AND METHODS

The Florida Board of Conservation's R/V Hernan Cortez was used in the survey. This ship is a conventional, double-rigged shrimp trawler, built in 1964. The vessel has an overall length of 72 feet, a 20-foot beam and 7-foot draft. Propulsion is provided by a diesel engine developing 340 hp. at 1,800 r.p.m. The fish hold was converted to sleeping quarters for 6 persons with additional berths on the main-deck cabin for the captain and 2 crew members. Fuel and water capacities were sufficient for 3 to 4 weeks of continuous operation, but galley and food-storage facilities limited the sea time to 6 or 7 days. A triple-drum trawling winch was driven by a main engine power take-off. Capacity of the two drums is about 350 fathoms of $\frac{1}{2}$ -inch cable. Electronic equipment aboard the Hernan Cortez included a loran receiver, magnetic-compass automatic pilot, AM radio receiver and transmitter, and a 0-450 fathom depth-recorder. The double-rig deck arrangement (Knake, Murdock, and Cating 1958) permitted dragging a single net from either side or two nets simultaneously.

GEAR

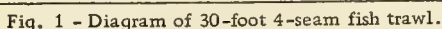
The trawls were scaled-down versions of the New England trawls (Knake 1956). The bracket doors were standard 6 feet by $3\frac{1}{2}$ feet and $5\frac{1}{2}$ feet by $3\frac{1}{3}$ feet constructed of wood with steel bracing and runners (Captiva and Rivers 1959).

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Sep. No. 764

mesh, No. 30 thread nylon webbings. Body of the net was of 2-inch-stretched mesh, No. 18 thread; funnel, $1\frac{1}{2}$ -inch-stretched mesh, No. 18 thread; intermediate, $1\frac{1}{2}$ -inch-stretched mesh, No. 36 thread and cod end, $1\frac{5}{8}$ -inch, stretched mesh, No. 36 thread.

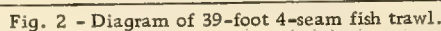
The headrope was hung on $\frac{3}{4}$ -inch-diameter polydacron rope; footrope was hung on $\frac{5}{8}$ -inch-diameter polydacron rope; dib lines (helpers) of $\frac{5}{16}$ -inch braided nylon rope were tied to the 4 seams running from the cod end to the wings. The head and footrope legs were extended 3 feet from the wings. Best fishing results were obtained with 8 evenly spaced 4- by 8-inch floats and a pair of floats tied at the center of the headrope. Wooden rollers, 6 to 8 inches in diameter, were strung on $\frac{1}{2}$ -inch wire ropes and attached to the footrope by 15-inch roller chain spacers every 2 feet. The rollers were used only along 10 feet of the center bosom section of the footrope. The footrope was weighted also over its entire length with $\frac{1}{4}$ -inch chain tied every 12 inches in loops of



The 39-foot 4-seam fish trawl had 40-foot 3-inch headrope and 48-foot 7-inch footrope.

The same size mesh, thread weight, and rope were used in this net as in the 30-foot net. The headrope was buoyed with 18 evenly spaced 4-by 8-inch plastic floats and two pairs of floats tied at midpoint; and the bottom section of the footrope was fitted with 15 wooden rollers and $\frac{1}{4}$ -inch chain in the same manner as the smaller net. A "kite" or rising-panel device to prolong the life of the headrope proved unsatisfactory because of excessive tangling during "shooting" operations.

Except for minor modifications, the roller-rigged fish trawls were



handled like standard double-rigged shrimp trawls (Knake, Murdock, and Cating 1958). The best towing speed was $2\frac{1}{2}$ knots with the engine turning 1,250 r.p.m. when using two nets, and 1,150 r.p.m. during single-net operation. A ratio of 3:1 of towing warp length to water depth was used normally, but increased to 4:1 when fishing shallower depths.

The rugged doors, heavy twine, and roller rig were used because broken bottom, coral reefs and loggerhead sponge areas characterized much of the area surveyed. Tears and hang-ups were frequent but damage to the gear was not excessive. The same nets were used throughout the entire survey. In gear evaluation studies a single net was fished with the rollers attached directly to the footrope, without spacers. Results indicated that spacers are a desirable feature in reducing bottom debris in the catch, especially cumbersome loggerhead sponges and coral.

The Hernan Cortez followed a transect course with trawl stations every 10 miles, and deviations from the track were made when echo-sounder tracings showed bottom configuration unsuitable for trawling. Drags were repeated in areas of large catches. Trawls were operated between 6 a.m. and 10 p.m., completing 5 to 7 drags per day. Trolling lines were fished whenever possible, fish traps set while at anchor, bridge lookout for surface schools maintained during daylight hours, and routine meteorological and water temperature data recorded at each station.

Port calls were made in Cedar Keys, Panama City, St. Petersburg, Fort Myers, and Fort Myers Beach, to unload fish and replenish supplies.

RESULTS

The main purpose of the survey was to explore for concentrations of fishes with commercial potential so data presented are limited to catches of over 5 pounds of a species from a single drag. A station summary, listing the total weight of fish per drag and significant species, is included in the appendix^{1/}

The most productive depths were 21 to 30 fathoms both north and south of Tampa Bay. This depth band coincided with the heaviest loggerhead sponge concentrations, especially south of Tampa Bay where one net produced over a ton of loggerheads during a 45-minute drag. Similar conditions were found earlier during the R/V Oregon shrimp explorations (Springer and Bullis 1954).

The largest fish catch, 525 pounds, consisted mostly of nonfood species. The least productive drags were made in 40 to 50 fathoms north of lat. $28^{\circ}28'$ N. and at all depths fished south of lat. $26^{\circ}30'$ N.

Of the 210 hauls that caught fish, 94 were made with double trawls and 116 with a single trawl. The average fish catch per single trawl was 23 pounds and for double trawl 105 pounds.

Five species of snapper were caught with vermilion snapper taken most frequently. Snapper were caught in 150 drags in depths over 10 fathoms. Red grouper, the most common of the five grouper species, were caught in all but the 30-40 fathom depth range.

Black sea bass were common in 5- to 10-fathom depths from Tampa Bay to Cape San Blas and rare in deeper water. The black sea bass appeared more often in drags deeper than 20 fathoms, from Tampa Bay southward.

Sixteen species of commercial interest (fish weighing over $\frac{1}{2}$ pound each) were caught. Selectivity of the gear, its small size, and relatively slow towing speed precluded capture of some large species.

Invertebrates of commercial interest included the Spanish lobster (bulldozer), which was captured at 59 trawl stations. Although present at all depths, it was taken more frequently in 20 to 30 fathoms between Tampa Bay and Fort Myers Beach. As many as five

^{1/}Appendix is available with reprint of this article (ask for Separate No. 764).

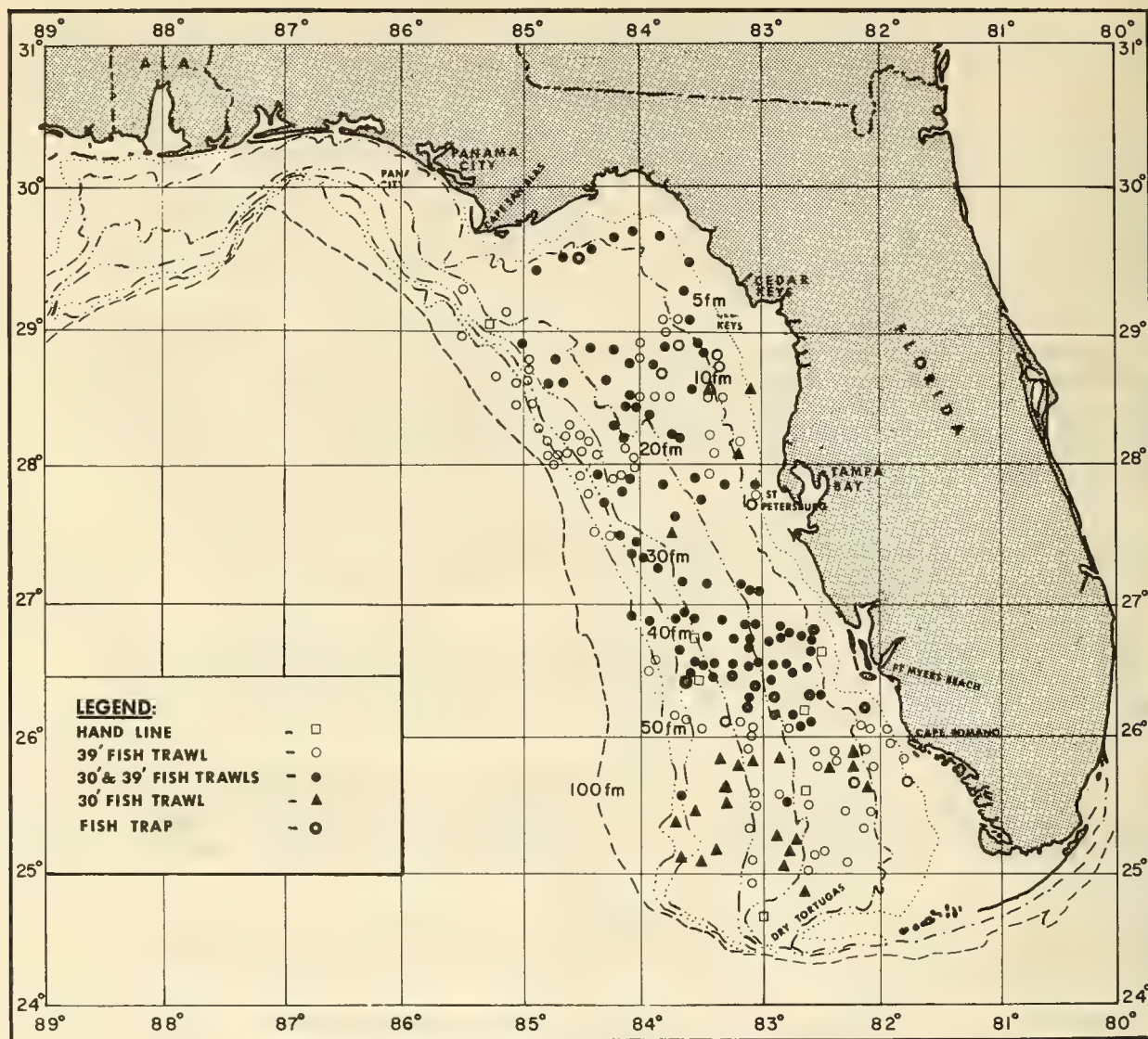


Fig. 3 - The survey fishing stations of the R/V Hernan Cortez.

were taken in a single drag, and the largest single specimen weighed 2 pounds. Night fishing produced only small numbers of pink and rock shrimp.

GENERAL NOTES

Surface schools of fish were observed frequently inside the 10-fathom contour, with greatest concentrations near Cape San Blas, Tampa Bay, Fort Myers Beach, and Cape Romano. Between Cape St. George and San Blas 18 to 20 schools, containing 8 to 10 tons each, of round scad (Decapterus sp.) were observed. Off Tampa Bay round scad and Spanish sardines (Sardinella anchovia) were found, each in schools of 3 to 5 tons. Spanish sardine schools of 2 to 4 tons predominated off Fort Myers Beach and Cape Romano. From Cape Romano southward the dominant species was thread herring (Opisthonema sp.) in schools of 2 to 10 tons; 12 to 14 schools could be observed at one time, usually in depths less than 10 fathoms. Little tuna (Euthynnus alletteratus) were seen in varying numbers throughout the study areas from Cedar Keys to Dry Tortugas, with heavier concentrations south of Fort Myers.

Trolling lines fished between stations produced little tuna, king mackerel, and Spanish mackerel. Weather during the survey was excellent with only 1 day of fishing time lost because of rough seas.

CONCLUSIONS

Although the survey trawls were smaller than typical commercial gear, catch composition proved fishing capability equal to shrimp trawls and demonstrated that roller-rigged fish trawls can be fished without excessive damage in areas unsuitable to conventional shrimp trawling. This type of fish trawl can be adapted for use on standard double-rigged and single-rig shrimp boats. In addition to preventing excessive trawl damage, rollers help considerably in avoiding undesirable bottom detritus.

Except for a few marginal catches, the survey did not show commercial concentrations of bottomfish. The catch per net was more than twice as productive on double-trawl drags than single-trawl drags.

RECOMMENDATIONS

1. Repeat this type of survey over the same and adjoining areas during fall and winter to determine changes in availability and composition of the bottomfish fauna.
2. Use fish-finding echo-sounders, preferably the "white line" type, in future surveys. Concentrations of fish could be located more readily and effectively fished.
3. Try larger trawls of 50- to 60-foot headrope length, and near-bottom midwater trawls in the 20-30 fathom depth to obtain some commercial measure of the available bottomfish stocks.

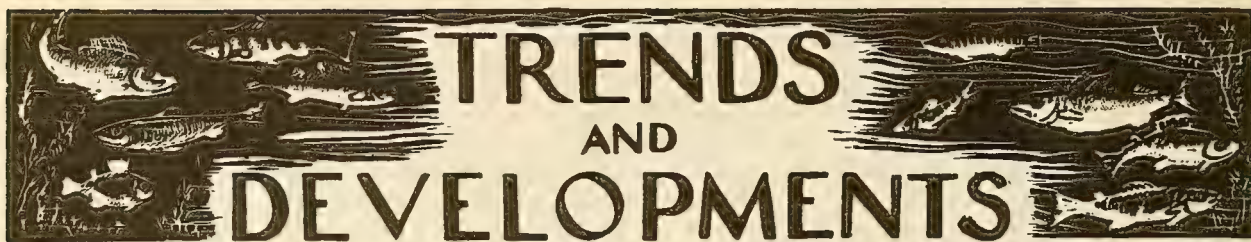
APPENDIX

A detailed appendix includes: Table 1 - Species Composition by 10-Fathom Intervals from Panama City to Tampa Bay; Table 2 - Species Composition by 10-Fathom Intervals from Tampa Bay to Dry Tortugas; Table 3 - Species Composition by One Degree Latitude from Panama City to Dry Tortugas; Table 4 - List of Species Referred to in Fishing Log of R/V Hernan Cortez, April 29-July 11, 1965 (213 Drags); Table 5 - Fishing Log of R/V Hernan Cortez, April 29-July 11, 1965. Appendix appears in Separate No. 764 of the article. For a free copy of the Separate write to Publications Office, U. S. Department of the Interior, Fish and Wildlife Service, Bureau of Commercial Fisheries, Washington, D. C. 20240.

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TRENDS AND DEVELOPMENTS

Alaska

USDI INSPECTION OF HERRING-EGGS-ON-KELP:

Food scientists of the Bureau of Commercial Fisheries, U. S. Department of the Interior, made in April 1966, the first USDI fishery product inspection in Alaska, announced the Bureau's Technological Laboratory at Ketchikan. The product inspected was herring-eggs-on-kelp, a product which has only recently been commercially harvested in Alaska. The herring-eggs-on-kelp were purchased by a United States firm for consignment to a Japanese firm in New York and required an inspection certificate as to quality as a condition of sale. The eggs were to be exported for consumption in Japan.

Herring spawn in large schools releasing their eggs and milt into the water en masse. They spawn in local areas along the Alaska coastline. The eggs contain a glue-like substance that causes them to stick to the bottom or to any growth over the bottom. Herring-eggs-on-kelp result from a small proportion of the spawn that attaches to a special type of large seaweed that belongs to the group of brown algae. In Alaska, the kelp and herring spawning occur together at Fish Egg Island near Craig, and on beaches near Hyaburg and Sitka.

Herring-eggs-on-kelp is a unique product and the USDI inspector was faced with some unusual problems. The primary concern of the Japanese buyer was that the cover of eggs on the kelp was sufficient. He specified that it was to exceed 350 eggs per square inch. The egg cover was estimated by first determining the number of eggs per gram by counting accurately weighed samples. Samples of kelp from the lot were then measured for area and the eggs stripped from these measured areas were accurately weighed to calculate egg cover.

Interior's USDI voluntary Inspection Service provides an impartial, official inspection

service for processed fishery products. It is administered by the Bureau of Commercial Fisheries and is available on a fee-for-service basis to anyone who has financial interest in the fishery product involved.

* * * * *

PEELABILITY OF FRESH PINK SHRIMP DISCUSSED:

A member of the U. S. Bureau of Commercial Fisheries Ketchikan Technological Laboratory presented in Seattle during March a special demonstration cutting of canned shrimp to about 25 industry, Bureau, and National Cannery Association technologists. Generally, the group was favorably impressed by the quality of the shrimp peeled "fresh" after short heat treatments instead of aging to loosen the shells. Color, flavor, texture, and possible yield are improved by the new process. The consensus seemed to be that progress is being made. The next step needed is commercial-scale production using the new process to determine its economics. Industry technologists did not seem particularly concerned about the gelling typical of shrimp peeled fresh and then heat processed.



Alaska Fishery Investigations

EARLIER RED SALMON EGGS REQUIRE THE MOST THERMAL UNITS:

Studies of the embryological development of eggs collected from the three spawning waves of Brooks River sockeye are showing that eggs from the earliest wave require the greatest number of thermal units to hatching while eggs from the latest wave require the least number of thermal units. The thermal regimen for eggs of each wave of spawning sockeye is different. Experiments have been designed and tests will be made for both genetic and environmental influences as they may affect the Brooks River sockeye to dis-

cover whether or not the separate waves of spawners are distinct genetic stocks.

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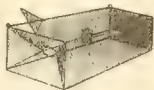
SPAWNING CHANNEL PINK FRY SURVIVAL ENCOURAGING:

Results at Little Port Walter, after sampling fry in the streambeds in Sashin Creek and Lovers Cove, were to be summarized in April 1966 by Bureau scientists. However, the overwinter survival appears to have been as good in the newly constructed spawning channel in Lovers Cove as in the natural gravel beds in Sashin Creek. Since the gravel in the channel will not be graded and cleaned of silt and organic debris until this summer, this preliminary egg survival test indicates that the channel will be a good testing site for future experiments. The channel survived the winter weather in excellent shape.

* * * * *

SHRIMP BEHAVIOR STUDIES CONTINUED:

Shrimp behavior trap studies at Little Port Walter were continued in March 1966. Shrimp were readily available during the month, providing a steady supply for aquarium studies. Bureau gear research scientists and divers from the Auke Bay Biological Laboratory spent a week observing the distribution of shrimp in the bay and their reactions to traps.



American Samoa

TUNA FLEET STATUS, JANUARY 1966:

A total of 104 foreign tuna fishing vessels (40 Japanese, 38 South Korean, and 26 Formosan) was fishing out of American Samoa in January 1966. In September 1965, 58 Japanese, 27 South Korean, and 11 Formosan vessels were fishing out of American Samoa. While the number of Japanese vessels has declined, there has been a sharp increase in South Korean and Formosan vessels. (Suisan-cho Nippo, March 4, 1966, and other sources.)



California

EXPERIMENTAL ANCHOVY FISHERY AS OF APRIL 20, 1966:

California's anchovy reduction fishery in Zone 2 (the area between San Pedro and Catalina) was expected to reach its 10,000-ton quota before the end of April 1966, and was scheduled for closure at midnight, April 26, according to the California Department of Fish and Game. However, catches in the other four zones were relatively light and closure of those zones was not anticipated before the overall season ended on April 30. The total catch for all five zones was 11,801 tons as of April 20, out of a total quota of 75,000 tons.

The regulations adopted by the California Fish and Game Commission provided that the Director of the Department of Fish and Game shall terminate the fishery in any zone if the zone reaches its quota before the overall season ended.

Through April 21, a total of 8,551 tons had been landed in Zone 2. Landings for the four previous days were 5 tons April 17, no landings on the 18th or 19th, and 352 tons on April 20. When the April 20 landings were completely tallied on April 21, it was decided to give the legally required five days notice to terminate the fishery in Zone 2, because of the possibility that the quota of 10,000 tons might be reached by April 26.

The Zone 2 area extends from Port Hueneme on the North to Dana Point on the South and reaches out to sea as far as Catalina Island. No anchovy reduction fishing was allowed within three miles of the mainland shore or the mainland side of Catalina Island. Most of the fishing effort was in that zone, because of its nearness to the majority of the fishing fleet and processing plants.

Through April 20, quotas and landings in the five zones were: Zone 1 (Point Conception to Port Hueneme) 10,000-ton quota, 811 tons landed; Zone 2, 8,324 tons landed; Zone 3 (Dana Point to the Mexican border) 10,000-ton quota, 930 tons landed; Zone 4 (the entire open ocean area west of Catalina and the Santa Barbara Islands) quota 35,000 tons, 1,402 tons landed; Zone 5 (from Point Conception North) 10,000-ton quota, 334 tons landed. (California Department of Fish and Game, April 23, 1966.)

* * * * *

ANCHOVY TAGGING PROGRAM CONDUCTED:

Nearly 15,000 anchovies were tagged and released by marine biologists of the California Department of Fish and Game during March-April 1966 in a tagging program designed to obtain vital information on anchovy movement, mortality, and commercial catch results.

The tagging program was conducted in connection with the experimental anchovy reduction fishery authorized by the California Fish and Game Commission which was scheduled to end on April 30, 1966.

When the anchovies are caught by commercial fishermen and taken to a reduction plant for grinding into fish meal, magnets on the reduction line pick up the metal tags and make it possible to recover them.

As of mid-April, a total of 7,990 anchovies in the $4\frac{1}{2}$ -to $6\frac{1}{2}$ -inch size range had been tagged in the San Pedro area and released into the ocean in various spots outside Los Angeles Harbor. Another 6,992 anchovies were similarly tagged off Port Hueneme and released in the same area.

About 60 tags had been recovered by the middle of April. Data from these tags was being analyzed, but State biologists reported that the tagged fish were caught in the approximate areas of release.

The tagging program was to continue, with hopes that about 100,000 anchovies would be tagged and released in 1966.



Cans--Shipments for Fishery Products, January 1966



A total of 123,973 base boxes of steel and aluminum was consumed to make cans shipped to fish and shellfish canning plants in January 1966 as compared with 178,968

base boxes used during January 1965.

Note: Statistics cover all commercial and captive plants known to be producing metal cans. A "base box" is an area of 31,360 square inches, equivalent to 112 sheets 14" x 20" size. Tonnage figures for steel (tinplate) cans are derived by use of the factor 23.7 base boxes per short ton of steel.

Source: U.S. Department of Commerce, Bureau of the Census.

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Central Pacific Fisheries Investigations

HUGE SKIPJACK TUNA POTENTIAL SEEN:

There are at least enough skipjack tuna in the eastern half of the Pacific Ocean to come near to doubling the entire present United States tuna catch, and possibly much more. That was one of the chief conclusions of a Governor's Conference on Central Pacific Fishery Resources, held in Honolulu and Hilo, Hawaii, February 28-March 11, 1966, at the invitation of Governor John A. Burns of the State of Hawaii.

The conference was sponsored by the Hawaii Department of Planning and Economic Development, the Hawaii Department of Land and Natural Resources, the U.S. Bureau of Commercial Fisheries, and the Department of Economic Development of Hawaii County.

Divided into three sessions, the conference first saw a group of biologists weigh the evidence on the abundance of skipjack, yellowfin, and big-eyed tuna. Next, the findings of the scientists were discussed with industry representatives and government officials. On the last day of the conference the group reported to the public on its findings.

The conference participants agreed that the Pacific holds enormous stocks of skipjack tuna. A minimal estimate of the potential annual yield for the eastern half of the Pacific was 100,000 tons. The conference stressed that this was probably a very low figure, and said that the true magnitude of the skipjack tuna resource cannot as yet be estimated, because of a lack of adequate data.

Locating and catching the skipjack of the central Pacific present great technical problems, however. The fish are found in an area about 10 times the size of the continental United States. Schools of young skipjack appear along the margins of the Pacific, and skipjack of all age groups near Hawaii and in various other island groups. Surface schools of skipjack, however, are only infrequently seen in the open seas.

Studies of the distribution and behavior of subsurface tuna with sonar and the modification or design of appropriate gear were seen as requisites to the harvest of these resources.

As for the Hawaiian fishery, the conference recommended that purse seining again

betried in Hawaiian waters. Experiments in 1950 and 1951 suggested that the method was not profitable in Hawaii, but there have been so many developments in purse seining since then that the conferees thought it worthwhile to make new tests.

Although strongly emphasizing the potential of the skipjack tuna fishery, the conference also considered the possibilities of two other fisheries, those for yellowfin and big-eyed tuna. Estimates of potential catch of the yellowfin were placed at an increase of 30,000 to 50,000 metric tons over the present Pacific long-line catch of 100,000 tons (exclusive of the eastern Pacific fishery area). Little increase in the present long-line big-eyed catch of 100,000 tons was seen as possible.

Cited as one of the chief scientific problems facing tuna research was that of establishing the identity of subpopulations of the various species. The U.S. Bureau of Commercial Fisheries Biological Laboratory in Honolulu has developed techniques to distinguish between subpopulations of skipjack tunas. So far, these have shown that there are at least two such subpopulations present in the Hawaiian fishery.

The Proceedings of the Conference will be published by the State of Hawaii. They will consist of two volumes, the first of which will contain the reports of the five working Groups on Skipjack Tuna, Yellowfin Tuna, Big-eyed Tuna, Gear Development, and Research Program. The second volume will carry a group of background papers, prepared primarily by members of the staff of the Bureau's Laboratory in Honolulu, dealing with tuna problems. The volumes should be published later this year.

* * * * *

OCEANOGRAPHIC RESEARCH PROJECT CONDUCTED SOUTH OF THE HAWAIIAN ISLANDS:

M/V "Townsend Cromwell" Cruise 20
(October 22-November 15, 1965): To study the wake system downstream of the Hawaiian Islands, locating the major eddies that make up this system and determining their apparent origin while studying the changes in salinity and temperature distributions in the area of the wake, was the principal objective of this cruise by the research vessel Townsend Cromwell. The vessel is operated by the U. S. Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory, Honolulu, Hawaii. The area of

operations was south of the Hawaiian Island chain, within the area bounded by latitude 16° N. to $21^{\circ}30'$ N. and longitude 156° W. to 162° W. (fig. 1).

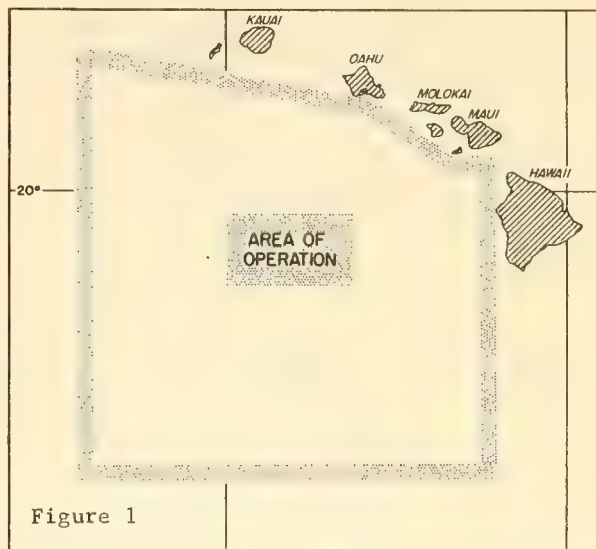


Figure 1
Fig. 1 - Area of operation, Townsend Cromwell, Cruise 20 (October 22-November 15, 1965).

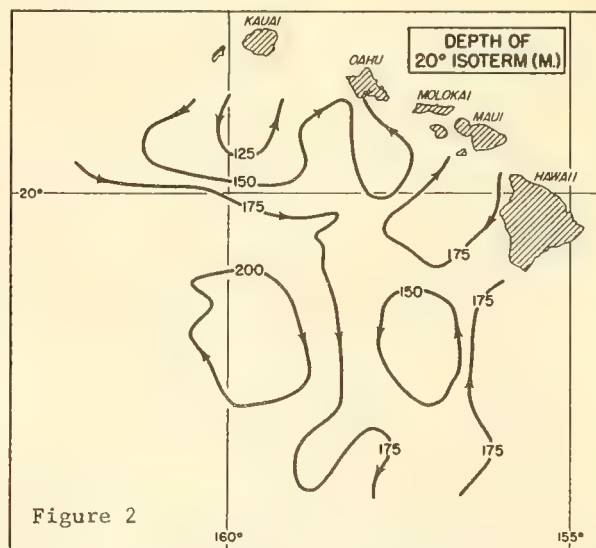


Figure 2
Fig. 2 - Location of anticyclonic eddies.

During the cruise 4 eddies were located by bathythermographs and the STD; their thermal structure was studied. Two cyclonic eddies were present with their centers at $21^{\circ}10'$ N., $158^{\circ}40'$ W. and 18° N., $157^{\circ}10'$ W. Two anticyclonic eddies were also present with their centers at $19^{\circ}50'$ N., $156^{\circ}40'$ W., and 18° N., $159^{\circ}30'$ W. (fig. 2).

After completing the preliminary survey, the pair of anticyclonic and cyclonic eddies nearest the island of Hawaii were studied. The first parachute drogue was launched at 19°41' N., 156°36' W. in the anticyclonic eddy. The second drogue was launched at 18°13' N., 157°41' W. in the cyclonic eddy, and the third drogue was launched at 18°51' N., 157°17' W. between these two eddies.

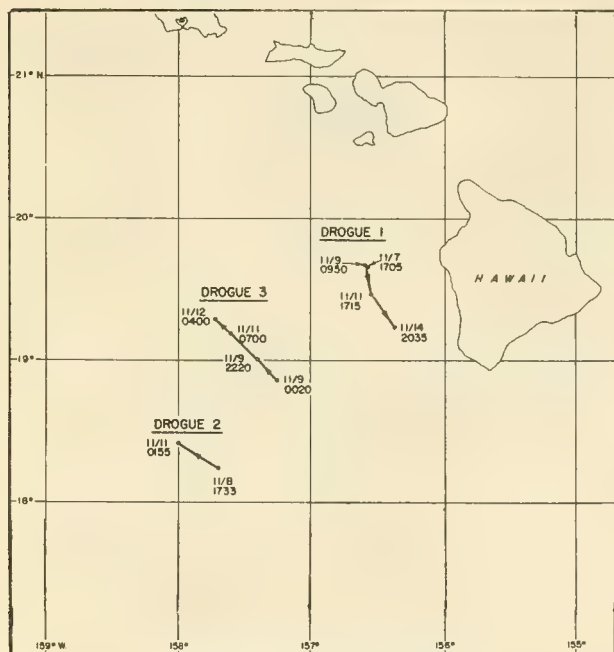


Fig. 3 - Drift of parachute drogues.

A watch for bird flocks and fish schools was kept throughout the cruise. A large number of birds and fish schools was seen. There seemed to be no association between fish schools and bird flocks and the eddy system.

During the cruise 786 drift bottles and 1,220 drift cards were released. The thermograph and barograph were operated continuously.

Standard marine weather observations were transmitted four times daily, except from November 12, 1965, at noon when the Weather Bureau requested a special weather report every 2 hours. These reports were transmitted until the cruise terminated.

The pyranometer was operated during the daylight hours.

Net radiometer readings were also taken for the Trade Wind Zone Oceanography Program.

Bathythermograph data were coded and transmitted four times daily to Fleet Numerical Weather Facility, Monterey, Calif.

The first drogue was nearly stationary for 2 days then moved south approximately 5 nautical miles per day. The second and third drogues moved in a northwest direction 8 and 12 miles per day, respectively (fig.3).

The trough and domes in the thermocline topography, which were associated with the eddies, showed displacement similar to those of the drogues.

The radio buoys (manufactured by Aquadyne Corp.) were acquired in order to determine the effective operating range under local conditions of these low-cost, low-power units. The 4-watt units could be detected at distances up to 8 miles with the ship's receiver and 2.8 miles with the radio direction finder, under the best conditions. The 1-watt unit could be detected at distances of up to 2 miles with the receiver and 0.3 mile with the RDF.

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TRADE WIND ZONE OCEANOGRAPHIC STUDIES CONTINUED:

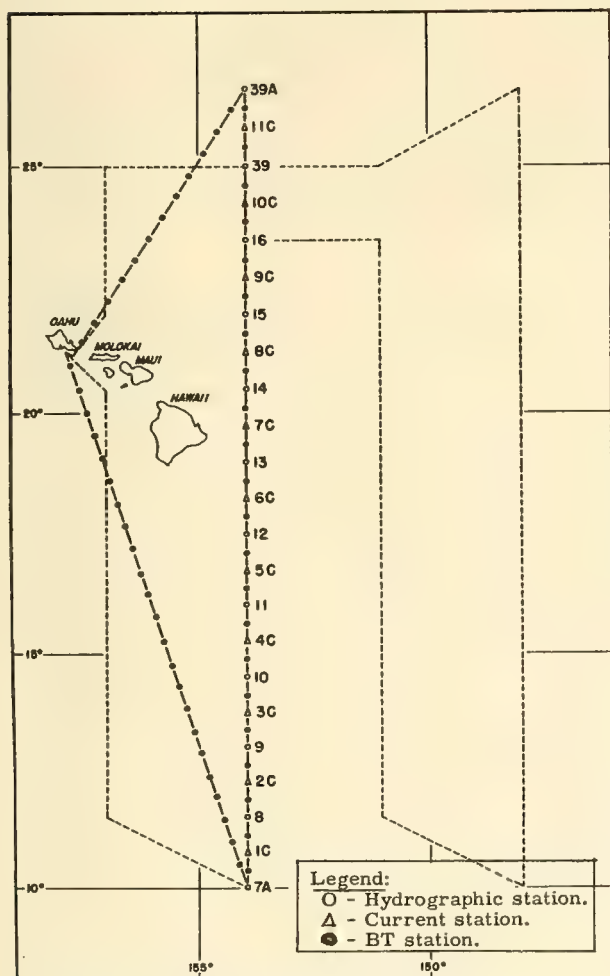
M/V "Townsend Cromwell" Cruise 21 (January 19-February 3, 1966): As part of the Trade Wind Zone Oceanography pilot study, the relationships between measured ocean currents and the distribution of properties are to be examined. To establish the necessary techniques and test the feasibility of such a study, this cruise of the Bureau's research vessel Townsend Cromwell was planned. The area of operations was in the Central North Pacific bounded by latitude 10° N., 27° N., and along longitude 154° W.

The primary purpose of the cruise--to develop techniques to measure ocean currents in the upper 500 m. from a moving ship--was accomplished. Field examination of data indicates that this method is feasible and applicable to the study of a variety of problems. There was also evidence that the major water masses in the upper 300 m. of the North Pacific Equatorial Current may flow at different speeds and/or direction. This was inferred from previous Trade Wind Zone Oceanography pilot study cruises, but was not measured directly.

At current station 6, southeast of Hawaii, the current changed from a westerly set at

50 m. to a northerly set at 150 m., and then to an easterly set at 250 m.

On each of 12 oceanographic stations spaced 90 miles apart along longitude 154° W., and between latitude 10° N. and 26.5° N., temperatures and salinity samples were collected at 20 levels to 1,500 m. Determinations for dissolved oxygen were made at each station and samples for PO₄-P analysis were collected and frozen.



Track chart of research vessel Townsend Cromwell, Cruise 21 (January 19-February 3, 1966).

Eleven current stations, located midway between oceanographic stations, were occupied for periods of 12 hours. Due to failure of other current meters on current stations 1 and 2, measurements at current stations 3 to 11 were made with an Ekman meter. On 26 current profiles from 10 m. to 1,000 m., 325 individual current measurements were made.

Bathythermograph casts were made to 270 m. at intervals of 3 hours on the way to station 7A, and between station 39A and Honolulu. Others were taken midway between and on oceanographic and current stations. Time-sequence bathythermograph casts were made on each current station at generally hourly intervals.

Bathythermograph data were transmitted each day to Fleet Numerical Weather Facility, Monterey, Calif.

Standard marine weather observations were made and transmitted.

Radiation from sun and sky was recorded daily and long-wave radiation measurements were made each night while on oceanographic stations.

Note: See Commercial Fisheries Review, October 1965 p. 29.

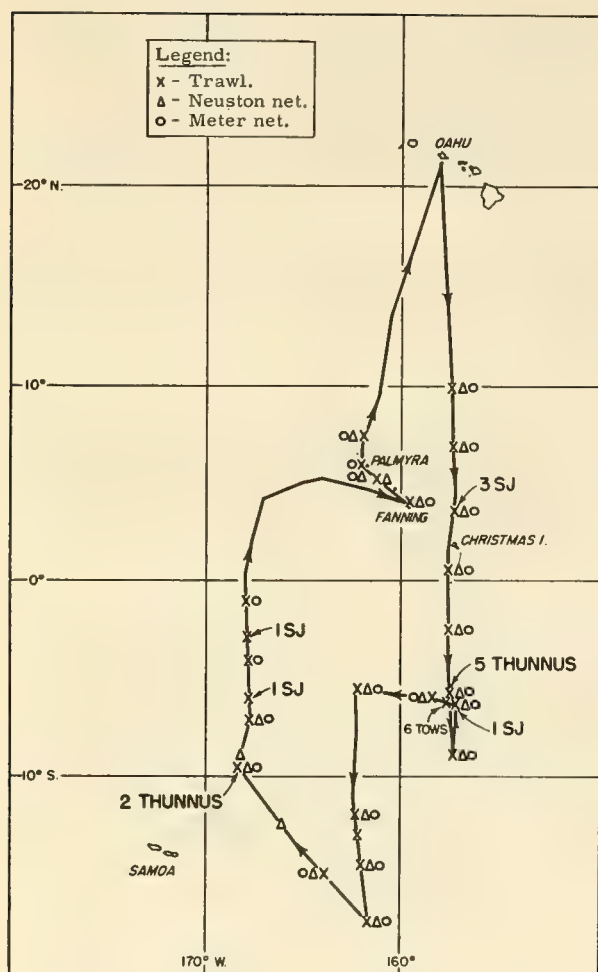
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TUNA BIOLOGICAL STUDIES CONTINUED:

M/V "Charles H. Gilbert" Cruise 89 (January 20-March 3, 1966): To search for young skipjack tuna (aku) a few weeks to a few months old to collect blood samples for analysis was the main objective of this cruise by the research vessel Charles H. Gilbert, operated by the U. S. Bureau of Commercial Fisheries Biological Laboratory at Honolulu, Hawaii. The area of operation was near the Line Islands and Samoa.

Young tuna of this age group, measuring from 1½ to 4 inches, are hard to catch and their elusiveness was apparent on this cruise. Of the 32 stations fished with a large midwater trawl net 25 feet in diameter, only 6 yielded young tuna (6 skipjack and 7 other tuna species). Neither of the other 2 nets used (one an unconventional net which skims the top 6 inches of water where young fish are often found, and the other, a net 6-feet square at the mouth, which was designed at the Bureau's Biological Laboratory, Honolulu, to fish at all depths) were successful in catching these young tunas in large numbers. The latter net, however, caught many larval tuna from ¼- to ½-inch in length. Unfortunately larvae this small does not provide blood in sufficient quantities for analysis.

Blood samples were obtained from 4 of the young skipjack. Although this is far from the hundreds of blood samples required to determine whether the fish came from a single group



Shows areas of operation during M/V Charles H. Gilbert Cruise 89 (January 20-March 3, 1966).

or whether they could be separated into several genetically different groups or subpopulations, it showed that it was indeed possible to draw blood samples from these tiny fish and the ultimate feasibility of this approach.

A large number of deep-sea fish and shrimp were also taken in the midwater trawl. Many of these fish represented rare groups. These fish and shrimp were quick frozen for subsequent study of deep water parasites by the University of California, Santa Barbara, Calif.

The Gilbert made a stop at Palmyra Island, where about 900 pounds of groupers and snappers were collected. These fish will be examined by the University of Hawaii scientists.

The vessel also brought back 140 live fish, mostly large mullets from Palmyra Island, which are to be used for experiments at the Oceanic Institute.

Note: See Commercial Fisheries Review, May 1966 p. 19.



Chesapeake Bay

RADIOACTIVE WASTES IN BOTTOM DEPOSITS STUDIED:

A sum of \$20,000 in grant funds has been awarded by the Atomic Energy Commission to the Virginia Institute of Marine Science for a continuing study of the concentration of suspended radioactive wastes into bottom deposits. According to the Institute's Director, the funds are applicable to the period January 1 through December 31, 1966.

The study was begun in 1960 when the Institute's head of the Department of Applied Biology hypothesized that radionuclides released into an estuarine system such as the Chesapeake Bay and its tributaries, might not be quickly flushed from the system. Early tests supported his concept that radionuclides would adhere to suspended silts and clays. These particles along with the algae, bacteria, and detritus are constantly removed from the water by filter-feeding animals and deposited on estuarine bottoms in compact biodeposits. Worms and other animals that live in bottom sediments ingest some of this material and mix it into the bottom strata, causing the radionuclides to become residual.

The objectives of the project are to: (1) Determine how radionuclides associated with suspended silts, clays, algae, bacteria, or detritus are removed from suspension by filter feeders and bound in biodeposits; and (2) understand the process of biodeposition in an estuary. Most important of all is a study of how biodeposits are incorporated into sediments by the action of benthic animals.

Experiments call for oysters and other test animals to be held in troughs where they will continually receive filtered water containing particles of known size. Sizes and numbers of particles entering each trough will be measured by a Coulter Counter. Particle removal by the test animals may then be determined.

The Institute's Director said, "We live in an age in which it becomes imperative to un-

derstand the final disposition of these sometimes dangerous by-products of man's inventiveness. There is no way of knowing when or where radioactive substances may be released upon society, and we must have knowledge of the possible effects and how to combat them." (Virginia Institute of Marine Science, April 14, 1966.)



Columbia River

"OPERATION COHO" LAUNCHED AS PART OF HATCHERY EVALUATION STUDY:

Plans for a Columbia River hatchery evaluation study involving the marking of about 6 million coho (silver) salmon over a two-year period was announced April 27, 1966, by the Bureau of Commercial Fisheries, U. S. Department of the Interior.

Under the program, which was launched in June, some 3 million young coho salmon of the 1965 brood year produced in hatcheries on the Columbia and its tributaries were to be marked by clipping their fins. An equal number will be marked during 1967.

Some of those marked cohos will return from the ocean as jack salmon in 1967. Starting in 1968, the remainder will return as full grown adults. Numbers of marked fish recovered in sport and commercial fisheries will provide a basis for determining the contribution of hatcheries to the overall fishery of the Pacific Coast.

Dr. L. Edward Perry, Director of the Bureau's Columbia River Program Office, said "Operation Coho" is a companion project to "Operation Fin Clip," the giant fall chinook salmon marking effort that started in 1962 in which a total of 32 million of that species have been marked over a 4-year period.

The purpose of both projects is to evaluate hatcheries as fish producers and to help decide whether expenditure of further funds to keep them operating is economically sound.

"Operation Coho" will involve 20 hatcheries. Of those, 5 are National Fish Hatcheries operated by the Bureau of Sport Fisheries and Wildlife, and Wildlife Service, U. S. Department of the Interior; 9 operated by the Washington Department of Fisheries; and 6 by the Fish Commission of Oregon.

About 10 percent of the coho salmon produced in each hatchery will be marked, except at Eagle Creek National Fish Hatchery, where 20 percent are to be clipped.

Cooperating with the Fish and Wildlife Service in "Operation Coho" are Fish Commission of Oregon, Oregon Game Commission, Washington Department of Fisheries, California Fish and Game Department, and fishery agencies of British Columbia.

Note: See Commercial Fisheries Review, May 1966 p. 21; Sept. 1963 p. 45; Oct. 1963 p. 31.

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CLARIFICATION SOUGHT ON INDIAN COMMERCIAL FISHERY:

The proposed start of commercial fishing by Yakima Indians on the Columbia River above Bonneville Dam on April 18, 1966, caused the Oregon Fish Commission to be very much concerned, according to the State Fisheries Director. The Indians would be fishing within the framework of an ordinance passed by the Tribal Council on March 23 but in violation of State law. The Fisheries Director pointed out that the Washington Department of Fisheries and the Oregon Fish Commission, the agencies responsible by statute for managing the commercial fisheries on the Columbia River, are still collecting vitally needed biological data before making any decision on a possible season for the non-Indian commercial fishery. A public hearing was scheduled on April 26 in Portland to consider the matter.

Important information was being collected from the test fishing program conducted by the two departments from March 15 through the end of April. In addition, dam counts were being studied carefully and other pertinent information collected as a basis for predicting the size of the spring run which in turn will govern thinking on proposed fishing regulations.

Because the run was expected to be somewhat smaller than in 1965, and in view of anticipated upriver passage problems, the two departments were very apprehensive about extensive fishing on that run. Apparently the very vital biological data which are still being collected were not considered by the Tribal Council in establishing their regulations which were set in March. As a result, the action by the Yakima Tribal Council (ostensibly to permit fishing to begin 9 days in advance of the regulation meeting by the State

agencies) was particularly disappointing. The Oregon Fish Commission believes that the needs of the resource are not being given the consideration they deserve by the Indian body.

The Yakimas who fish commercially with gill nets in the Bonneville pool area and on upstream contend they are within their rights granted by the treaty of June 9, 1855. During a press conference on Indian fishing problems in Portland on March 4, 1966, it was announced that the State planned to take action against Indians fishing above Bonneville Dam in violation of State laws. Some progress has been made in resolving the Indian fishing problem in recent years but the gains were rather insignificant in the face of the growing problem, Oregon's fisheries director said.

When the Dalles Dam flooded out Celilo Falls, the Indians were paid \$27 million to compensate for loss of their dip-net fishery there. Following loss of the Celilo site, the Indian commercial fishery in the Columbia declined temporarily. However, from a low catch of 39,000 pounds of salmon and steelhead in 1959, the Indian commercial fishery has increased steadily each season until 1965 when an estimated 1 million pounds were taken by the tribesmen. The Commission believes that the sharp increase in the Indian fishery will threaten the future of the Columbia River resource (particularly certain runs) and jeopardize the existing salmon management program.

The Fisheries Director said law enforcement officers of Washington and Oregon had mutually drawn up plans to enforce commercial fishing regulations. In Oregon, both the Governor and Attorney General support the stand that the State has exclusive authority to manage the fishery resources of Oregon and that present State conservation laws and regulations apply equally to all citizens, Indian as well as non-Indian. Consequently, enforcement of State laws will be undertaken irrespective of any Indian tribal ordinance.

Early in March wholesale fish dealers were notified of the intention of the fisheries agencies to step up enforcement activities. In a letter widely distributed to buyers and others it was stated that any fish dealer purchasing fish taken from closed waters will be subject to prosecution.

Because any commercial fishing by the Yakima Indians above Bonneville will be in

violation of State law, citations will be issued to fishermen or dealers involved in taking or handling fish from the closed area.

Enforcement activities are to be closely coordinated by the Oregon State Police and Washington fish and game law enforcement office. An all-out effort is planned to uphold the State laws in both states to assure protection of the very vital spring chinook stocks. This planned action received support when the Federal District Court refused to issue an injunction requested by the Yakima Tribal Council to prohibit State agencies from arresting Yakima Indians fishing under the provisions of the tribal ordinance. The Court's decision indicated the Indians will have to take their chances in court if they choose to ignore State conservation regulations.

The Fisheries Director said, "It is not our intention to deprive the Indians of any treaty right by this action. We are in need of further meaningful clarification of treaty rights and State authority over Indian fishing activities. In the absence of this, but with our present statutory authority we are taking this action to insure having runs of fish to work with when the determination is made. The resource needs the protection of a meaningful management program." (Oregon Fish Commission, April 15, 1966.)



Federal Purchases of Fishery Products

DEPARTMENT OF DEFENSE PURCHASES, FEBRUARY 1966:

Fresh and Frozen: The Armed Forces are a major buyer of fresh and frozen fishery products. Purchases of fresh and frozen fishery products for the Armed Forces in February 1966 totaled about 2.5 million pounds with a value of about \$1.6 million. This represents an important market for the U. S. fishing industry.

Table 1 - Fresh and Frozen Fishery Products Purchased by Defense Personnel Support Center, February 1966 with Comparisons

QUANTITY				VALUE			
February		Jan. -Feb.		February		Jan. Feb.	
1966	1965	1966	1965	1966	1965	1966	1965
	(1,000 Lbs.)					(\$1,000)	
2,531	2,036	4,754	4,406	1,642	1,311	2,907	2,776

In February 1966 purchases of fresh and frozen fishery products for the Armed

Forces were up 13.9 percent in quantity and 29.8 percent in value from the previous month. The increase was due mainly to larger purchases of shrimp, scallops, salmon steaks, ocean perch fillets, and haddock fillets and portions.

Table 2 - Principal Fresh and Frozen Fishery Products Purchased by Defense Personnel Support Center, February 1966 with Comparisons

Product	February				Jan.-Feb.	
	1966		1965		1966	1965
	Qty.	Avg. Cost	Qty.	Avg. Cost	Qty.	Qty.
	Lbs.	c/Lb.	Lbs.	c/Lb.	Lbs.	Lbs.
Shrimp:						
raw headless . . .	92,230	112	94,700	97	144,230	184,400
peeled and deveined . . .	93,100	146	51,080	135	127,100	154,160
breaded	337,917	88	242,020	89	515,867	603,420
molded and breaded . . .	21,900	68	19,150	72	28,900	95,250
Total shrimp . . .	545,147	108	406,950	96	816,097	1,037,230
Scallops	273,750	56	156,180	84	526,500	321,580
Oysters:						
Eastern	46,848	123	99,296	100	95,904	138,772
Pacific	13,000	91	23,982	80	38,550	62,226
Total oysters . . .	59,848	116	123,278	96	134,454	200,998
Fillets:						
Cod	33,300	43	82,850	36	54,300	114,750
Flounder	270,700	47	236,000	37	627,200	624,450
Ocean perch	583,600	41	325,500	36	987,600	694,790
Haddock	164,000	39	145,900	38	384,500	272,000
Haddock portions . .	230,138	52	101,050	48	467,388	309,550
Steaks:						
Halibut	107,500	50	105,750	49	197,100	208,650
Salmon	20,577	71	9,490	65	31,937	14,490
Swordfish	-	-	320	61	500	860

Compared with the same month in the previous year, purchases in February 1966, were up 24.3 percent in quantity and 25.2 percent in value. Average prices were generally higher in February 1966 as compared with the same month in 1965.

Canned: Salmon and sardines were the main canned fish items purchased for the Armed Forces in January-February 1966.

Table 3 - Canned Fishery Products Purchased by Defense Personnel Support Center, February 1966 with Comparisons

Product	QUANTITY				VALUE			
	February		Jan.-Feb.		February		Jan.-Feb.	
	1966	1965	1966	1965	1966	1965	1966	1965
	. . . (1,000 Lbs.) . . .				. . . (\$1,000) . . .			
Tuna . .	1/	-	821	641	2/	-	466	291
Salmon .	11	5	2,061	6	7	4	1,377	5
Sardines .	179	80	211	111	102	49	118	69
1/Less than 500 pounds.								
2/Less than \$500.								

Notes: (1) Armed Forces installations generally make some local purchases not included in the data given; actual total purchases are higher than shown because data on local purchases are not obtainable.

(2) See Commercial Fisheries Review, May 1966 p. 22. Source: U. S. Department of Defense, Defense Personnel Support Center, Philadelphia, Pa.

* * * * *

VETERANS ADMINISTRATION REQUIREMENTS FOR 1966:

Following are the estimated requirements of the Veterans Administration for fishery products to be procured in 1966:

Item	Case Size	Quantity Case
Canned:		
Clams, chopped, in nat. juice	No. 3 Cyl.	2,000
Salmon:		
coho, dietetic	No. 1/2	2,100
medium red or coho with skin and backbone	No. 1	2,400
red or sockeye	No. 1	3,100
Sardines, veg. oil, Fancy Grade	15-oz.	1,000
Shrimp pieces, freeze-dried (peeled, headless, precooked) . .	No. 10	200
Tuna:		
lt. meat, solid pack, lge. pieces, dietetic	No. 1/2	2,300
lt. meat, chunk style, packed in veg. oil	64-oz.	6,300
Frozen:	Size	Pounds
Cod portions	4-oz.	43,000
Flounder portions	4-oz.	33,000
Haddock portions	4-oz.	74,000
Halibut steaks	4-oz.	27,000
Salmon steaks	4-5 oz.	6,200
Ocean perch fillets	8-12 per lb.	115,000
Sea scallops	med.	37,000

Note: Requests for bids will be announced as they are issued. For additional information, contact the Marketing Division for Subsistence, Veterans Administration Supply Depot, P. O. Box 27, Hines, Ill. 60141.



Fish Farming

POND-REARED CATFISH HAS GOOD MARKET POTENTIAL:

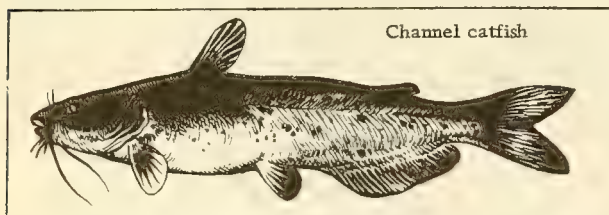
Probably more catfish are now raised annually in the United States than any other fresh-water fish--about 35 million pounds. Fish farmers are devoting more than 20,000 acres to raising catfish; about one-third of the acreage is in the South-Central States. Arkansas leads, followed by Texas, Louisiana, Mississippi, Missouri, Oklahoma, and some states outside this area. In addition to those acres where catfish are raised intensively, there are thousands more where raising catfish is part of a system of crop rotation--catfish one year, rice the next. After one year's growth, catfish (in the round or whole) sells for about 50 cents a pound at the fish farms or, after dressing and packaging, at 90 cents a pound at the retail level.

Catfish is also known by other names. It is often called Rocky Mountain dressed catfish, Mississippi River channel catfish, and farm-raised catfish. Occasionally, it is called barbed trout. The catfish has been tradi-

tionally accepted in the South-Central States, and the channel catfish is the most popular member of the family.

Economists of the Department of the Interior's Bureau of Commercial Fisheries say the commercial production of catfish in the United States can reach 60 million pounds a year.

Fish ponds in which to raise catfish range in size from less than 1 acre to 4 or 5 acres. To build a pond, the farmer builds a levee. A rectangular pond with a smooth bottom is favored because it permits the easiest use of a net to collect the fish. To get every last one of them, the pond is drained. Later, it may be planted with crops. It costs \$200-\$300 an acre to build a pond. The standard rental is \$50 an acre, with ponds and water supply provided. Water is obtained from wells 75-175 feet deep. In the Mississippi Delta, the supply of groundwater is unlimited because it is fed by the river and its tributaries.



The most important fish raised in these ponds is the channel catfish, but farmers also produce bait minnows--fathead, golden shiners, goldfish--and buffalofish, crappies, bass, and frogs.

Nearly all farmers feed their pond-raised fish with pellets prepared to meet the nutritional requirements of the fingerlings. About 1.8 pounds of feed produce about one pound of weight gain in one year. The fish then weigh from $1\frac{1}{4}$ to $1\frac{1}{2}$ pounds and, after they are cleaned to be sold as food, weigh a pound or less. The farmers also fertilize the water to grow plants for the fish to eat. Production per acre per year is 750 to 1,000 pounds.

There are several alternatives for marketing catfish. Some farmers provide spawning facilities and raise the fish to fingerlings, which they can sell to other farmers at 5 cents apiece--or continue to raise the fingerlings to market size. Grownfish can be sold to stock ponds for fee fishing--or to restaurants or retailers as whole or dressed fish.

Nearly all sales of catfish as food products are made within 300 to 500 miles of the fish farms.

The main problem for the fish farmer to overcome is the expense of processing. It costs him 25 cents a pound to raise a fish and 10 cents to process it, during which 45 percent of the weight is lost. The farmer invests 52-53 cents a pound before he can sell the dressed fish for 90 cents. That's why most fish producers prefer to sell their fish live for about 50 cents a pound. Of necessity, fish farmers are trying to merchandise the catfish on its own identity, i.e., it is not a catfish caught just anywhere but one raised under ideal conditions in a farm pond.

Raising catfish has a good potential for the fish farmer. The possibility of expanding the industry is very good because production per acre is high and water supply is more than adequate. The Bureau is developing and demonstrating the use of gear best suited to the industry and gathering information on market conditions. However, Bureau economists warn that if production is greatly expanded, the market potential will change considerably. A significant increase in production could saturate existing markets and other less profitable outlets would have to be sought.



Fish Protein Concentrate

LEGISLATIVE AUTHORITY TO BUILD LARGE-SCALE PLANT RECOMMENDED BY INTERIOR DEPARTMENT:

Legislation which would authorize the U.S. Department of the Interior to develop practicable and economic means for the commercial fishing industry to produce a purified protein product known as fish protein concentrate (FPC) has the Department's support, it announced April 29, 1966. A bill now in Congress (S. 2720) would increase the present research and experimentation program and finance plants to produce FPC.

The Interior Department said there is a present need for one new plant and that it would cost no more than \$1 million. It would be based on research findings from the existing model-scale unit at Beltsville, Md., which is operated by Interior's Bureau of Commercial Fisheries. Scientists using a solvent extraction process developed a tasteless and

odorless fish protein concentrate from whole red hake, which has been termed "highly nutritious, inexpensive, and entirely fit for human consumption" by the National Academy of Sciences.

The next necessary step is to determine if an equally satisfactory product can be produced on a semi-commercial scale, Interior said. It added that it is also necessary to create more concentrate for testing purposes so it can be determined where and how much of it can be used as a supplement to other foodstuffs.

Building one plant at this time would provide guidance for future construction of solvent-extraction plants if and when they became necessary, the Interior Department said, explaining that research under way continues to seek whether fish other than hake can be used as successfully. Also, two other basic processes for producing the concentrate are being studied. It may be that development of either or both these processes would produce a better product and make the solvent-extraction process relatively uneconomical or even obsolete, Interior said.

It has been noted by Interior that several major United States food manufacturers are interested in testing the feasibility of incorporating FPC into one or more of their products.

Organizations such as the Agency for International Development, the United Nations Children's Fund, World Health Organization, and the Food and Agriculture Organization of the United Nations also are interested in supplementing the diets of millions of protein-starved people in developing nations by using the protein concentrate, the Interior Department said.



Fur Seals

PRICES FOR ALASKA SKINS AT SPRING 1966 AUCTION:

The semiannual auction of United States Government-owned sealskins was held April 21-22, 1966, in Greenville, S.C. Approximately 21,000 Alaska sealskins were offered for sale for the account of the United States Government, together with 4,700 Alaska sealskins for the Government of Japan, 23,000

South African sealskins, and 2,800 Uruguayan sealskins. Prices in general were up about 25 percent over the October 1965 sale. Average prices per skin for the U.S. skins were (changes from October 1965 sale shown in parentheses): Matara \$120.51 (up 21.2 percent); Black \$138.61 (up 27.1 percent); Kitovi \$118.46 (up 22.9 percent); Natural Lakoda \$102.10 (up 26.3 percent); Brown Lakoda \$56.69 (up 46.8 percent); Black Lakoda \$64.79 (up 4.0 percent).

At the spring 1966 auction, male and female skins were sold in mixed lots the same as in the fall 1965 auction. A total of 16,283 fur sealskins were offered for sale by the U.S. Government at the previous auction held in October 1965 (11,760 dressed, dyed, machined, and finished skins, 3,148 Lakoda skins, and 1,375 sheared skins).

Note: See Commercial Fisheries Review, January 1966 p. 30, and June 1965 p. 21.



Great Lakes

MICHIGAN'S FIRST PLANTINGS OF SILVER SALMON:

The State of Michigan's introductory plantings of silver or coho salmon were made this past March by the Conservation Department of that State in the Platte River, Benzie County, and Bear Creek, Manistee County. The first release was made on March 22 when 50,000 silver salmon smolts were stocked in the Platte River at the bridge on Maple City Road. On the following day, another 200,000 fish were liberated into the same stream directly from the Department's Platte River Trout Rearing Station.

Plantings also got under way March 23 in Bear Creek where about 350,000 of the salmon were to be released the following week. The releases were earlier than expected due to an unexpected spring break-up. As soon as stream conditions permitted in the Upper Peninsula, 225,000 young silver salmon were to be stocked in Baraga County's Big Huron River. This would complete the State's first-year program of introducing these fish in Michigan's Great Lakes waters. If all goes well, the 5-6 inch fish planted this past spring will quickly migrate downstream into Lakes Michigan and Superior. They will grow for about two years in those big waters, then re-

turn to the rivers to spawn in the fall of 1967.

As part of the State of Michigan Conservation Department's overall program to revitalize fishing in the Great Lakes, the Platte River and Bear Creek each received 50,000 yearling rainbow trout during March when the salmon releases were made. Another 50,000 rainbows were to go into the Big Huron River at the same time the salmon were planted. It was hoped the additional plantings will help step up runs of steelheads (migratory rainbows) in Great Lakes streams.

Michigan's full-scale releases of silver salmon will put Michigan sportsmen strictly on their honor since those fish are not protected by law. Anglers catching silver salmon this past spring were urged to return them to the planted waters. Actually, fishermen may have a hard time telling the difference between silver salmon and rainbow trout because the two species as yearlings bear a striking resemblance to each other. However, one clue in distinguishing them is that the salmon has spots only on the top half of its tail while the rainbow's entire tail is spotted. Also, the anal fin of the salmon and trout differ. In the salmon, this fin is greater in length than it is in height. The opposite is true of trout, including the steelhead.

Since silver salmon are new in Michigan and not covered by regulations, there is yet no size limit for them. However, anglers can help future fishing for silver salmon by not creeling any fish under the seven-inch limit which covers rainbow trout. In most cases, this will automatically rule out keeping silvers because the big majority of salmon smolts planted this past spring are below that size. (News Bulletin, Michigan Department of Conservation, Lansing, March 24, 1966.)

Note: See Commercial Fisheries Review, February 1966 p. 18.



Great Lakes Fisheries Explorations and Gear Development

ALEWIFE SPAWNING MIGRATIONS STUDIED:

M/V "Kaho" Cruise 31 (March 29-April 28, 1966): To delimit alewife concentrations and to follow their spring spawning migra-

tions shoreward was the objective of two 10-day surveys in southern Lake Michigan by the exploratory fishing vessel Kaho, operated by the Bureau of Commercial Fisheries, U. S. Department of the Interior. The surveys were scheduled to cover the portion of Lake Michigan in waters from off Ludington, Mich., and Two Rivers, Wis., southward.



U. S. Bureau of Commercial Fisheries exploratory fishing vessel Kaho.

The characteristics and timing of the alewife runs are of extreme importance to the newly developing Lake Michigan industrial fish fisheries which now supply both pet-food manufacturers and fish-meal reduction plants. The information will also help lakeside municipal and industrial water users to cope with alewife spawning migrations which create problems at some Lake Michigan water intakes.

A high-resolution, fish-detecting white-line, echo-sounder was the primary assessment tool to be used. Sounding runs were to be made at and between previously established fishing stations around the perimeter of the Lake. A standard 50-foot (headrope) bottom trawl was to be used to verify the composition and density of fish concentrations revealed by the echo-sounding runs.



Gulf Fishery Investigations

Some of the highlights of studies conducted by the U. S. Department of the Interior's Bureau of Commercial Fisheries Biological Laboratory, Galveston, Tex., during January-March 1966:

SHRIMP BIOLOGY PROGRAM: Shrimp Larvae Studies: During the quarter, examination of plankton samples collected in July and August 1964 indicated that planktonic stages of *Penaeus* sp. shrimp were six times more abundant in waters between Galveston and Port Mansfield than between Galveston and the Mississippi River. Greatest numbers were in samples from the 15- to 25-fathom depth zone. Of the total catch of *Penaeus* sp. 11 percent were nauplii, 76 percent protozoae, 5 percent mysids, and 3 percent postlarvae. The abundance of indicators of recent spawning (nauplii and protozoae) suggests that more spawning occurred during July and August than in May and June.

Four cruises were made in waters off Galveston to locate bottom concentrations of *Penaeus* sp. postlarvae during the period December 1965-February 1966. Samples were collected from the water column as well as from the substrate at station depths of 3 to 20 fathoms. Results showed that *Penaeus* sp. postlarvae were more abundant both on bottom and in the water column inshore at 3-fathom stations. A major objective of this study was to determine whether postlarvae had left the water column and burrowed into the substrate when water temperatures fell below 16° C. (60.8° F.). Relatively cold water temperatures (mean 13.4° C. or 56.2° F.) prevailed during that study period. Although few postlarvae were taken in the initial cruises, it appeared that they were more readily available on bottom than in the water column. This was most evident at depths greater than 6 fathoms. In the later cruises, particularly at 3-fathom stations, large numbers of postlarvae occurred both in the water column and on the bottom.

It is planned to resume this study next fall and winter. With improved gear and better knowledge of where these postlarvae are, it is hoped to gain a better understanding of the habits of *Penaeus* sp. postlarvae before their spring movement into the nursery area.

A morphological study comparing measurements of most of the body parts of pink and brown shrimp larvae was near completion during the quarter. Preliminary examination of the data indicates that naupliar substages exhibit no significant differences between species. In the protozoal and mysis stages, however, there are slight differences, which we hope will be sufficient to differentiate the species.

Cultivation of Shrimp in Artificial Ponds: Preparation of ponds and equipment for the next rearing season were made. The ponds were drained and all potential shrimp predators were removed. The filter boxes, through which inflowing water passes, were cleaned and refilled with crushed shell. A scanning tele-thermometer with a continuous recorder was tested, adjusted, and installed. Its thermal probes were placed at critical positions in the ponds. Screens for sorting postlarval shrimp were made and the collecting and sampling nets used the previous season were repaired.

Algal cells, occurring in the waters of the shrimp culture ponds, were being cultured in several concentrations of inorganic and organic fertilizers. This information will be an aid in establishing guidelines for fertilizer applications to the rearing ponds.

Surveys of Postlarval Abundance and Fisheries for Bait (Juvenile) Shrimp: Semiweekly sampling for postlarval shrimp at Galveston Entrance, and weekly sampling at Aransas Pass, Rollover Pass, and Sabine Pass continued during the quarter. Relatively mild weather prevailed during the early part of the winter and a few postlarvae came into the bays until mid-January. At that time, cold weather apparently curtailed immigration. Catches of postlarval brown shrimp increased during late February and March, but it was too early to tell whether the peak migration for the year had been reached.

Statistical coverage of the bait-shrimp fishery in Galveston Bay was continued on a weekly schedule. As is characteristic of the season, few juvenile shrimp were taken by the Galveston Bay bait shrimp fishery. Most of the shrimp sold as bait were white shrimp from the Freeport area.

Drift bottles and seabed drifters were released in mid-February in near-shore depths (3 to 7 fathoms) between Galveston and Freeport. The aim of this study is to define inshore currents and to determine their possible role in the transport of postlarval shrimp to the passes. Through March, 27 percent of the seabed drifters and 47 percent of the drift bottles had been recovered. Water movement, according to recoveries, has been from east to west. Almost half of the bottles recovered were found on south Padre Island.

Migrations, Growth, and Mortality of Commercial Shrimp: Work during the quarter was devoted to analyzing data from past mark-recapture studies. Examination of the growth information collected from the experiments conducted on pink shrimp in Florida during January and October of 1965, reveals that the estimates from those two studies are similar. Investigation of white shrimp growth in Galveston Bay during 1965 produced rates that are comparable to those gathered in 1963. Analysis of brown shrimp data collected from Mississippi during 1963 has yielded good estimates of the growth parameters for this species.

Efforts are under way to increase the efficiency and mobility of field staining operations. Toward that end, fiberglass tanks have been constructed to replace heavy wooden ones formerly used for holding shrimp; a light weight, disposable container for releasing shrimp was being tested; and a rapid means for staining shrimp has been devised.

ESTUARINE PROGRAM: Ecology of Western Gulf Estuaries: The previous year's biological sampling pattern was evaluated and modified during this quarter. Sampling stations were maintained in each subbay area of the Galveston estuarine system on the basis of major estuarine nursery units. These nursery units are Dickinson Bayou (lower Galveston Bay), Clear Lake (upper Galveston Bay), Cedar Bayou (mouth of San Jacinto River), Cross Bayou and Double Bayou (Trinity Bay), and Marsh Point (East Bay). One station was maintained in the Bolivar Roads Tidal Pass to monitor the movement of animals through that area.

The croaker was the most numerous major species caught in trawls during the quarter, followed in de-

scending order of abundance by the bay anchovy, spot, large-scale menhaden, blue crab, white shrimp, sand sea trout, whiting, brown shrimp, hardhead catfish, and gafftopsail catfish. The croaker and bay anchovy accounted for over 85 percent on the trawl catch. Croakers and spot (0 year class) increased in abundance during the quarter. A few juvenile white and brown shrimp evidently remained in the estuary all winter.

Postlarval brown shrimp were not caught in the estuary during early winter as they were in 1965. They were first caught (average 2 per 5-minute tow) in Bolivar Roads Tidal Pass, lower Galveston Bay (except in the peripheral areas), and in East Bay during late February. By early March, postlarvae were collected everywhere in the estuary except Trinity Bay. Cool water temperature in combination with low salinities probably excluded postlarvae from those waters.

EXPERIMENTAL BIOLOGY PROGRAM: Behavior and Ecological Parasitology: The potential ecological significance of burrowing as a low temperature response of postlarval brown shrimp was examined further during the quarter. Analysis of the laboratory's field results reveals a marked non-random distribution of brown shrimp postlarvae in regard to water temperatures. Most of those shrimp were taken at temperatures of 19°-22° C. (66.2°-71.6° F.), a range similar to that which caused emergence of burrowed postlarvae in the laboratory. Those and other field results have been incorporated into a manuscript titled, "A Behavioral Comparison of Postlarval *Penaeus aztecus* and *P. setiferus*. With Special Reference to Burrowing as a Response to Reduced Temperature." The included field and laboratory data support the conclusion that burrowing may have survival significance to brown shrimp postlarvae before and after their arrival at bays in early spring.

Experiments designed to provide estimates of postlarval swimming stamina are in progress, representing one phase of a continuing study on the nature of postlarval movements.

Continuous measurement of field temperatures is nearing completion at the Bureau's East Lagoon Laboratory. Measurements made in 1965 showed a shallow peripheral zone to be consistently warmer than nearby deeper water during the spring period when brown shrimp postlarvae move into the estuarine environment. One annual cycle has been recorded and data being taken will be used for comparison with spring temperature patterns in 1965.

Growth and Survival Studies: A study was conducted with postlarval brown shrimp to observe growth at various population densities. In past growth experiments there has been a wide final size range of animals in a given aquarium. The current test was made to determine if size variation could be attributed to crowding or container size. Test containers were different size beakers--1-, 2-, and 4-liter capacity. Four densities of animals were tested at each capacity--1, 5, 10, and 20 shrimp. These were maintained for 28 days at approximately 26° C. (78.8° F.) 23‰ salinity. Water was changed in all containers at about 5-day intervals. At the end of the test period, all animals were weighed and measured.

At densities of 1, 10, and 20 shrimp the difference in growth between containers was slight. With the ex-

ception of beakers containing one animal, there was an increase in growth with increase in beaker size. The difference in size was most pronounced with 5 animals in the beakers. Best growth was in the group of 5 animals in a 4-liter beaker. Those shrimp exhibited an average growth rate of 1.11 millimeters per day during the 28-day test period.

Two studies are being conducted at the request of the laboratory Shrimp Dynamics Program. The first study involved testing survival of postlarval brown shrimp exposed to low temperatures. Such information is needed as a guide in field sampling for abundance of postlarvae arriving in nursery areas after winter's last lethal low temperatures. Shrimp were exposed to low temperature for 24, 48, and 72 hours. Three temperatures were used--2°, 5°, and 8° C.--with a control group held at 17° C. (62.6° F.). No animals survived exposure to 2° for 24 hours. After 48 hours, survival at 5° decreased to 55 percent. Survival at that temperature decreased to 14 percent after 72 hours with other temperatures (8° and 17° C.) maintaining near 100 percent survival. The second study, which involves testing the effect of crowding on survival of juvenile and sub-adult white shrimp has been in progress.

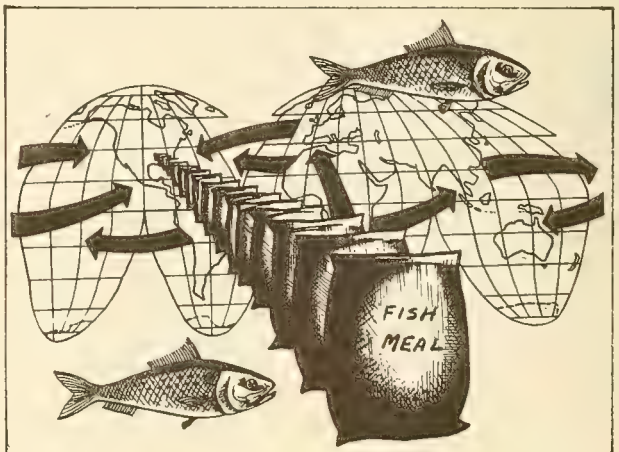
Note: See *Commercial Fisheries Review*, March 1966 p. 24.



Industrial Fishery Products

U. S. FISH MEAL SUPPLIES IN 1965 AND EARLY 1966:

World fish meal production in 1965 dropped for the first time since Peru became the major producer-exporter of this protein-rich poultry and animal feed ingredient. The decline in world production was the result of a large decrease in Peruvian output which more than offsets production increases in the United States, Iceland, and Norway. As world demand for fish meal continued to increase, the lower production forced prices up to record levels.



U. S. supplies of fish meal in 1965 totaled 524,000 tons--down 22 percent from 1964. U. S. production of 253,000 tons increased 6 percent over the previous year, but imports--largely from Peru--amounted to only 271,000 tons, or down 38 percent.

With a strong domestic demand and small supplies available, prices of both domestic and imported fish meal in New York City advanced from near \$140 a ton in January 1965 to \$186 in December and averaged \$165 for the year. This was \$33 a ton above the 1964 average price, and the highest on record.

During January and February 1966, imports from Peru were 17 percent below a year earlier. United States demand for fish meal was strong along with continued expansion in the broiler industry, but considerable resistance has built up to the high price levels.

Peru normally accounts for about two-thirds of the fish meal production of the six major fish exporting countries and contributes about three-fourths of total U.S. imports. But there has been some concern among Peruvian biologists that Peru could not maintain her position as leading producer-exporter if the anchovy catch was continued at the level of the 1963/64 season. With this in mind, and after a decrease in output during the 1964/65 season, the Peruvian Government imposed a three-month closed season beginning June 1 with the 1966/67 season opening on September 1, 1966. Should fish meal production for the balance of the 1965/66 season be on a par with the previous season, production for the entire 1965/1966 season would not be materially different from the 1964/65 season. Peruvian marketing organizations and dealers expected world production would be near that of 1965 and attempted to maintain the high price level that existed in December 1965.

However, record anchovy landings in January and February 1966 caused stocks to accumulate rapidly, and by mid-March they had increased to nearly 50 percent above a year earlier. As Peruvian stocks began to build up, prices started to weaken.

About mid-April 1966, Peruvian fish meal prices (burlap bagged) f.o.b. East Coast and Gulf ports averaged \$152 a ton, compared with \$150 a ton at the same time a year earlier.

(U.S. Bureau of Commercial Fisheries, Branch of Current Economic Analysis, Industrial Fishery Products Section.)

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U. S. FISH MEAL, OIL, AND SOLUBLES:

Production by Areas, March 1966: Preliminary data as collected by the Bureau of Commercial Fisheries, U. S. Department of the Interior:

U. S. Production ^{1/} of Fish Meal, Oil, and Solubles, March 1966 (Preliminary) with Comparisons			
Area	Meal	Oil	Solubles
	Short Tons	1,000 Pounds	Short Tons
March 1966:			
East & Gulf Coasts	1,216	258	1,682
West Coast ^{2/}	2,495	289	1,416
Total	3,711	547	3,098
Jan.-Mar. 1966 Total . . .	8,111	1,153	5,617
Jan.-Mar. 1965 Total . . .	8,181	1,709	2,667

^{1/}Does not include crab meal, shrimp meal, and liver oils.
^{2/}Includes American Samoa and Puerto Rico.

* * * * *

Production, February 1966: During February 1966, a total of 268,000 pounds of marine animal oils and 2,064 tons of fish meal were produced in the United States. Compared with February 1965 this was a decrease of 210,000 pounds of marine animal oils and 193 tons of fish meal and scrap. Fish solubles

U. S. Production of Fish Meal, Oil, and Solubles February 1966 ^{1/} with Comparisons				
Product	Feb.		Jan.-Feb.	
	1/1966	1965	1/1966	1965
	(Short Tons)			
Fish Meal and Scrap:				
Herring	2/	298	2/	542
Menhaden 3/	-	-	2/	2/
Tuna and mackerel . .	1,360	1,635	2,958	3,549
Unclassified	704	324	1,442	936
Total 4/	2,064	2,257	4,400	5,027
Fish Solubles:				
Menhaden	2/	-	2/	-
Other	1,350	803	2,519	1,710
Total	1,350	803	2,519	1,710
	(1,000 Pounds)			
Oil, body:				
Herring	-	124	-	287
Menhaden 3/	-	-	-	2/
Tuna and mackerel . .	183	254	370	490
Other (inc. whale) . .	85	100	236	274
Total oil	268	478	606	1,051

^{1/}Preliminary data.
^{2/}Included in "unclassified" or "other."
^{3/}Includes a small quantity of thread herring.
^{4/}Does not include a small quantity of shellfish and marine animal meal and scrap because production data are not available monthly.
 Source: U. S. Department of the Interior, Bureau of Commercial Fisheries.

production amounted to 1,350 tons--an increase of 547 tons as compared with February 1965.

* * * * *

U. S. FISH MEAL AND SOLUBLES:

Production and Imports, January-February 1966: Based on domestic production and imports, the United States available supply of fish meal for the first 2 months in 1966 amounted to 44,961 short tons--1,579 tons (or 3.4 percent) less than during the same period in 1965. Domestic production was 627 tons (or 12.5 percent) lower and imports were 952 tons (or 2.3 percent) lower than in January-February 1965. Peru continued to lead other countries with shipments of 27,118 tons.

U. S. Supply of Fish Meal and Solubles, January-February 1966			
Item	Jan.-Feb.		Total 1965
	1966	1965	
. . . . (Short Tons). . . .			
Fish Meal and Scrap:			
Domestic production:			
Menhaden	-	1/	175,838
Tuna and mackerel	2,958	3,549	25,410
Herring	1/	542	12,859
Other	1,442	936	39,264
Total production	4,400	5,027	253,371
Imports:			
Canada	6,839	6,046	43,830
Peru	27,118	32,512	209,801
Chile	1,932	2,080	5,651
Norway	22	-	78
So. Africa Rep.	500	200	5,100
Other countries	4,150	675	6,206
Total imports	40,561	41,513	270,666
Available fish meal supply . .	44,961	46,540	524,037
Fish Solubles 2/:			
Domestic production			
	2,519	1,710	98,017
Imports:			
Canada	149	249	1,488
Iceland	33	-	-
Other countries	12	2,066	3,650
Total imports	194	2,315	5,138
Available fish solubles supply	2,713	4,025	103,155

1/Included with "other."
2/Wet weight basis except for imports from South Africa Republic.
Source: U. S. Department of the Interior, Bureau of Commercial Fisheries, and U. S. Department of Commerce, Bureau of the Census.

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Source: U. S. Department of the Interior, Bureau of Commercial Fisheries, and U. S. Department of Commerce, Bureau of the Census.

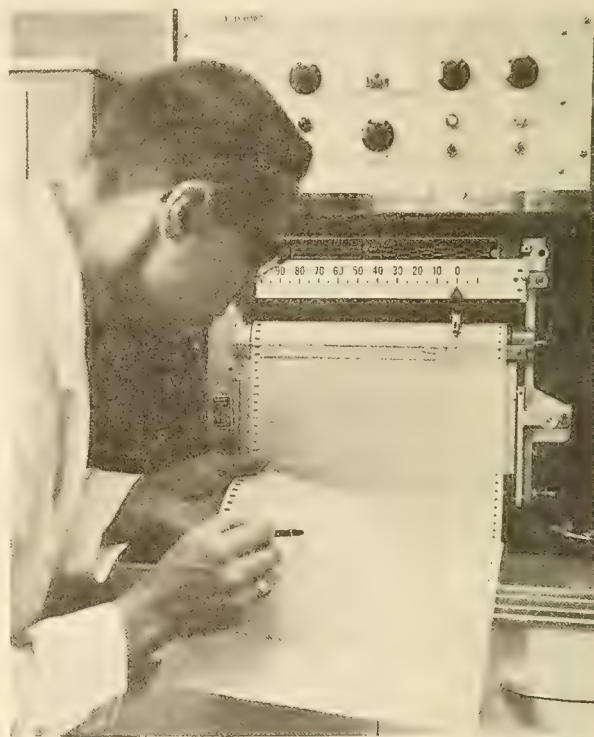
The United States supply of fish solubles during January-February 1966 amounted to 2,713 tons--a decrease of 32.6 percent as compared with the same period in 1965. Domestic production of fish solubles increased 47.3 percent and imports of fish solubles decreased 91.6 percent.

* * * * *

SCIENTISTS STUDY WHY FISH OILS BECOME RANCID:

A new research unit of the Bureau of Commercial Fisheries, U. S. Department of the Interior, has begun studying the problems produced by the oxidation of fish oils. Oxidation is the combination of oxygen from the air or other source with these oils--producing new compounds and ultimately undesirable flavors or odors.

Scientists at the Bureau's Seattle, Wash., technological laboratory will study the oils while they are still in the fish, after they are extracted, and especially at very early stages of the normal storage period.



A chemist of the U. S. Bureau of Commercial Fisheries Technological Laboratory at Seattle, Wash., studies a fatty acid analysis of fish oil as the results evolve from an instrument called a gas chromatograph.

Fish oils are used today to make pharmaceuticals, plastics, and chemicals. A large market for fish oils exists in the European margarine industry.

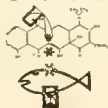
In the past, research revealed much information about the changes fish undergo after extensive oxidation. But little was discovered

about the way oil from freshly-caught fish oxidizes, and how this can be controlled. Early changes have an important impact both on the quality of industrial oils and on the flavor and quality of fresh fish. These changes do not cause fresh fish to become inedible; however, they do lower quality by producing either a flat tasteless condition or a slightly unpleasant rancid flavor. Researchers hope that long-term findings of the new unit will establish the fundamental knowledge necessary to control such changes.

New research data may prove valuable in producing industrial oil of better quality. In time, research of the type conducted by the new unit may develop fish oils, prepared under food-plant conditions, that will be acceptable as human food in the United States. A significant potential use of fish oils was recently foreshadowed by a statement of the American Heart Association. The Association recommended greater use of polyunsaturated fats in the human diet to reduce blood serum cholesterol, which may reduce the incidence of the heart condition known as atherosclerosis. Fish oils have a high proportion of polyunsaturated fatty acids.

The new group, called the Food Science Pioneer Research Unit, occupies space in the new Bureau laboratory building on Montlake Boulevard East, in Seattle. It has seven full-time and four part-time employees. Some of its work will be done in cooperation with the University of California at the Davis and Berkeley campuses.

The unit is headed by Maurice E. Stansby, who has been Laboratory Director of the Bureau's Technological Laboratory in Seattle since 1942. He will continue to hold this post, too, until his successor is chosen.



Maine Sardines

PROGRESS IN LONG RANGE PREDICTIONS OF HERRING SUPPLY:

Progress on a method for predicting the quantities of herring that might be available off the Maine coast from several months to a year in advance was reported by scientists of the U. S. Bureau of Commercial Fisheries at an industry-government meeting, held in Augusta, Me., this past April.

This and other developments were presented to 40 Maine sardine canners and their representatives during a briefing on a major long-term Gulf of Maine herring research program being conducted by the Bureau's biological laboratory at Boothbay Harbor. At the meeting, the difficult matter of making accurate predictions was pointed out and that several promising breakthroughs were being further evaluated. The industry looks upon such predictions as being of incalculable importance in the successful operation of sardine canneries in Maine.

Activities of a large Soviet fishing fleet in the Gulf of Maine was another principal topic of the meeting. The Bureau's project director said the Soviet operations were being closely studied in the hopes of ascertaining what effect, if any, they may be having on the State of Maine inshore sardine herring supply. Other phases of the research studies were described in detail by scientists of the Bureau's biological laboratory. (Maine Sardine Council, Augusta, Me.)



National Fisheries Institute

EXPANDED PROMOTIONAL PROGRAM PLANNED FOR 1966

"FISH 'N SEAFOOD PARADE":

The 21st Annual Convention of the National Fisheries Institute (NFI) was held at the Shamrock-Hilton Hotel, Houston, Tex., April 22-26, 1966. The Convention's theme was "Yesterday is History--Tomorrow is Opportunity." It was the biggest convention in NFI's 21-year history, with attendance topping all previous records.

The general sessions included talks on "Highway to Profits," presenting the fisheries' new and expanded promotional program, and the "Exploding Market," a discussion of the institutional market.

Arthur H. Frohman of Chicago, Ill., the newly elected president of NFI, and former chairman of its Fish 'n Seafoods Promotions Division, said that the economic importance of young people is fully realized. Of the some 4 million people who reach the age of 18 each year, nearly half of them are going to decide whether and how often they buy fishery products. Also to be considered at the other end

of the age spectrum is the number of persons 75 years of age and older, and that this age group will increase by 20 percent between now and 1975. "The great health and longevity benefits of seafood are well known to us. But only by the full force of a determined industry can we realistically stress the national consumption of fish and seafood," he said.



Poster and pole display material for the 1966 national Fish 'n' Seafood Parade.

The "Fish 'n Seafood Parade" promotional program for 1966 will include something new to give added stimulus to the entire campaign. Two new phases are being inaugurated by the NFI Fish 'n Seafoods Promotion Division which should be particularly helpful in increasing fishery products sales through retail outlets.

The first phase of the program is the development of a promotional book for distribution to retailers. The book will include theme headers for newspaper ads, in hand lettering and with line art work samples of the headers in 8-, 5-, and 3-column material, as well as in spot color and shading and screening. It will also include examples of how elements can be rearranged to create

store ads with fishery products. With the promotional book, the food-store advertising manager will be in a better position to promote fishery products and tie-in with the national campaign.

The second phase of the program will be a unique trade contest aimed at the Advertising and Merchandising managers of the supermarket chains. All studies show that the homemaker thoroughly reads food store ads. The contest will have full-page ads in which "fish 'n seafood" will be the dominant theme. This will make the trade much more aware of fishery products and alert the consumer to buy more. NFI members who are sponsoring the program will be identified with the contest. Their representatives will have the opportunity to present the contest to the trade.

These new phases of the program will be backed up by a large food publicity program of pictures, recipes, and articles in all media. Also, there will be trade ads in the retail and mass feeding magazines. A guide book of the entire program will be issued to assist the "Fish 'n Seafood Parade" committees to take advantage of the expanded 1966 promotional campaign.

All promotions--both national and regional--will have the full cooperation of the U. S. Bureau of Commercial Fisheries, as in the past. The Bureau's field representatives will work closely with committees of businessmen in carrying out their regional promotion programs. Fishery bulletins and cookery leaflets distributed by the U.S. Bureau of Commercial Fisheries will feature the economy and easy availability of fishery products.

Note: Merchandising materials for the promotional campaign may be obtained through local seafood packers and processors.



Nautical Charts

LIST FOR PACIFIC COASTAL WATERS:

The free distribution to mariners of catalogs listing all available nautical charts for use in navigating U. S. Pacific coastal waters from the Mexican to the Canadian border, was announced by the Coast and Geodetic Survey, U. S. Department of Commerce, on April 29, 1966. The catalog for the Pacific coast also includes Hawaii, Guam, and the Samoan Islands.

A catalog will be issued in late summer for Alaskan waters. A similar catalog is already available for the Atlantic and Gulf Coasts, Puerto Rico and the Virgin Islands. The catalogs are accordion-folded, similar in format to road maps.

The catalogs list the numbers of all charts, the areas they cover, chart prices, and the scale of each chart. Both small craft and conventional charts are listed. Small craft chart numbers and the outline of the area covered are shown in green and the conventional nautical charts in magenta and blue. The catalogs also include a list of tide tables, coast pilots (sailing directions), current tables and tidal current charts.

Nautical chart diagrams have been available before, but on a much more limited scale. Information up to now has generally been furnished only for specific areas rather than for entire coasts.

The catalogs are available, in person or by mail, from Coast and Geodetic Survey chart distribution centers at 121 Customhouse, San Francisco, Calif. 94126; 620 Federal Office Building; 90 Church St., New York, N. Y. 10007; and 1125 Commerce Building, Washington, D. C. 20230. A list of the 600 agents who sell nautical charts is also available in a similar format.



North Atlantic Fisheries Investigations

DISTRIBUTION OF LARVAL HERRING IN GULF OF MAINE STUDIED:

M/V "Rorqual" Cruise 2-66 (February 14-March 6, 1966): To determine the distribution of larval herring along the coastal Gulf of Maine was the objective of this cruise by U. S. Department of the Interior's Bureau of Commercial Fisheries research vessel Rorqual. The vessel operated in the coastal area between Cape Ann and Grand Manan Channel.

BIOLOGICAL OBSERVATIONS: Fifty stations were occupied. Three-mile oblique tows were made at each station using the Boothbay trawl no. 4. One oblique tow with a Gulf III sampler was made in the Grand Manan Channel.

PRELIMINARY FINDINGS: Some 1,912 larval herring were caught ranging in stand-

ard length from 17 to 46 mm. The heaviest concentrations were found in Ipswich Bay and off Bluehill, Frenchmans, and Pleasant Bays. Mean lengths were generally larger in the west and east and smallest near Penobscot Bay. The largest mean length was from a catch off Machias Bay.

Surface temperatures and salinities were taken at each station. Five drift bottles and five sea-bed drifters were released at 21 standard stations. A Nansen bottle cast, a bathythermograph cast, and a Secchi disc reading were taken at the Grand Manan station.

Note: See Commercial Fisheries Review, January 1966 p. 42.



North Pacific Fisheries Explorations and Gear Development

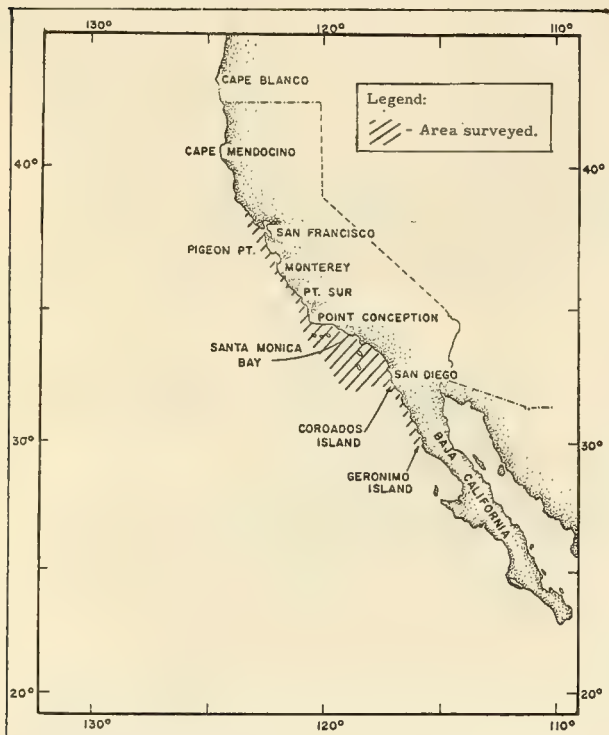
HAKE POPULATION SURVEY CONTINUED:

M/V "John N. Cobb" Cruise 76 (February 14-March 25, 1966): A six-week exploratory hake-fishing survey along the coast of California was completed March 25, 1966, by the John N. Cobb, research vessel of the U. S. Department of the Interior's Bureau of Commercial Fisheries. The cruise was conducted in cooperation with the Bureau's Seattle and La Jolla Biological Laboratories, Seattle Technological Laboratory, and the California Department of Fish and Game.

Objectives of the cruise were to: (1) determine the geographic and bathymetric distribution of schools of Pacific hake (Merluccius productus) with the major emphasis on locating and sampling spawning hake concentrations; (2) obtain biological data on hake; and (3) obtain additional data relative to the catching efficiency of the "Cobb" pelagic trawl.

The principal gear used was a standard "Cobb" pelagic trawl constructed of 3-inch mesh multifilament webbing. It was fished with the standard two aluminum hydrofoil-type otter boards on 30-fathom bridles. A high-resolution, low-frequency echo sounder was used to locate the fish and a dual electrical depth telemetering system was used to monitor the fishing depth of the net. An experimental anchovy trawl was also used in the latter part of the cruise. This net is fished in the same manner as the "Cobb" pelagic trawl, and it is constructed of $\frac{3}{4}$ -inch number 9 thread, knotted multifilament nylon.

Echo-sounding transects were conducted in accordance with information gained from preliminary hake egg and larvae surveys. Traces of fish observed on the sounder were fished with the "Cobb" pelagic trawl.



Area surveyed during Cruise 76 of the M/V John N. Cobb (February 14-March 25, 1966).

The Scripps Institute of Oceanography's research vessel Alexander Agassiz conducted hake egg and larvae surveys in conjunction with the Bureau vessel's cruise to help locate spawning schools of hake. The Institute's vessel surveyed the area from Point Conception, Calif., to Geronimo Island, Baja California. A number of stations in the northern sector yielded fair catches of hake eggs and larvae.

The John N. Cobb sounded the coastal waters from San Francisco to Geronimo Island, mainly in the waters between Point Conception and San Diego. The stations where the eggs and larvae were found were surveyed in detail as well as the area off Coronado Islands, where hake were found during 1965, but no adult concentrations were located.

Good signs of fish were observed off Point Sur and Monterey Bay. They were about 125 to 150 fathoms below the surface and over a

bottom depth that ranged from 300 to 600 fathoms. But the weather was such that no hauls were made.

The only other distinct sign of fish observed during the cruise was in Santa Monica Bay. The trace was fair, but the size of the school was small, 1 to 3 miles in length and width. They were located at a depth of 110 fathoms, over a bottom depth of 150 fathoms.

Two 1-hour hauls were made through that school, which yielded 50 and 100 pounds of small immature hake. Those fish ranged from 13 to 29 centimeters (5.1-11.4 inches).

The school was observed with the echo-sounder throughout the afternoon and evening; it rose in the evening and dispersed. The following morning it was relocated in approximately the same place after sunrise.

A port call was made in San Francisco on the return trip to Seattle. Representatives of a fishing company there supplied samples of hake caught by a local trawler. The fish, which were large and spawned out, were taken off Pidgeon Point in 145 to 150 fathoms of water, and the tracing of the echogram was excellent. This seemed to be the time of year the hake start appearing in the San Francisco area.

The research vessel Alaska of the California Department of Fish and Game was scheduled to work in conjunction with the Bureau's vessels in fishing and locating hake. But a leak occurred in their fuel tanks and they were in the shipyard during most of the cruise. During part of the week of March 14-18 the two vessels worked together in scouting for fish and comparing sounding traces.

Note: See Commercial Fisheries Review, April 1966 p. 29.



Oceanography

NEW RESEARCH VESSEL "OCEANOGRAPHER" DELIVERED TO GOVERNMENT:

The Oceanographer, the largest, most modern and completely automated vessel built in the United States to probe the secrets of the oceans was delivered to the Federal Government on April 26, 1966.

Delivery of the \$7 million "floating laboratory," the most advanced vessel of its kind in

the world, was accepted on behalf of the Government by the Maritime Administration, U. S. Department of Commerce, which designed it and supervised its construction. It will be operated by the Coast and Geodetic Survey.

The Oceanographer brought to 14 the number of vessels in the fleet of the Coast and Geodetic Survey, an agency of the Commerce Department's new Environmental Science Services Administration. It is the largest vessel ever built in the United States for the express purpose of deep-sea oceanographic surveys and research. It will be followed later this year by a sistership, the Discoverer.

The Oceanographer is constructed so that it can operate equally well in any area of the global sea, including waters of the Arctic and Antarctic. A bow thruster of 400 hp. located in a transverse tunnel through the vessel's hull enables it to maintain a constant heading at low speeds despite wind and wave conditions. The vessel's specialized equipment permits extensive oceanographic, meteorological and marine geophysical research. (U.S. Department of Commerce, April 26, 1966.)

Note: See Commercial Fisheries Review, January 1966 p. 45.

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NEW HYDROGRAPHIC VESSEL LAUNCHED FOR U. S. COAST AND GEODETIC SURVEY:

A new hydrographic survey vessel, the Davidson, of the Coast and Geodetic Survey, U. S. Department of Commerce, was launched May 7, 1966, at Norfolk, Va.

The Davidson is named for George Davidson, a 19th century geodesist, geographer, and astronomer of the Coast and Geodetic Survey, sometimes referred to as "the father of Pacific Coast geography."

The Davidson's keel was laid November 22, 1965, and the vessel is scheduled for completion early in 1967. Following commissioning, she will become part of the Coast and Geodetic Survey's expanding fleet, which now consists of 14 vessels. They survey coastal waters, search for underwater navigational hazards, make gravity and magnetic measurements, conduct tidal and tidal current surveys, and engage in deep sea oceanographic surveys and research.

The Davidson is being equipped with specialized depth recorders and positioning sys-

tems. She is being built of welded steel construction strengthened for navigation in ice and will be propelled by diesel engines, with twin-screw, reversible-pitch propellers. The vessel will have accommodations for 6 officers and a crew of 30.

While the Davidson will engage primarily in hydrographic surveys, she will also have limited oceanographic facilities. The ship is designed for hydrographic coastal surveying, including the setting up and support of shore parties.

Officers who man the Davidson will be commissioned personnel of the Environmental Science Services Administration (ESSA). Last year, the commissioned corps of the Coast and Geodetic Survey became a part of ESSA, a new Commerce Department bureau formed by the amalgamation of the Coast and Geodetic Survey, the Weather Bureau, and the National Bureau of Standards' Central Radio Propagation Laboratory, to serve as the national focus for the study of environmental problems.

The Davidson is a sistership of the McArthur, which was launched at Norfolk November 15, 1965. (U. S. Department of Commerce, May 7, 1966.)



Oregon

STEELHEAD STOCKING PROGRAM:

Liberation into the Willamette River system above Willamette Falls of 55,000 steelhead smolts from the Oregon Fish Commission's Big Creek hatchery near Astoria was scheduled for completion in early April 1966, according to the Commission. The Oregon Game Commission, cooperating in the project, furnished supplemental trucks and drivers to help haul the fish to the upriver planting sites. Among the streams receiving Big Creek steelhead were the South Yamhill River, Willamina Creek, Agency Creek, North Yamhill River, and Mill Creek near Buell. This is the second year of the program which has as its objective the establishment of a steelhead run in the Yamhill River system. Last year 45,000 yearlings were released into South Yamhill tributaries.

The young steelhead measure from 7 to 8 inches in length and are ready, after a year of rearing at Big Creek hatchery, to migrate

to the ocean. The survivors will return as adults on their initial spawning run during the late fall and winter of 1967/68. Although they were reared at Big Creek, the transplanted fish will return to the streams in which they were liberated and from which they began the long trip to the ocean. Enthusiastic about the fine physical condition of the fish, the Commission predicted that returns from the current liberations could be excellent. Returning adults from this plant, due back during the 1967/68 season, will have the benefit of the new Willamette Falls ladder.

An additional 55,000 yearlings reared at Big Creek, a lower Columbia River tributary, were scheduled for liberation into the hatchery stream in late April. The Commission said 4,169 adult steelhead returned to Big Creek hatchery in the past season. Eggs were taken from 200 females to supply fish cultural needs and 116 females plus a like number of adult males were transported with a Game Commission truck to the North Yamhill River and liberated to help build up the run in that stream. The remaining 3,000 adults were allowed to pass upstream to spawn naturally in Big Creek.

The egg take this season totaled 702,000, some 115,000 more than last year's 587,000 take. During recent years, steelhead eggs surplus to the Big Creek hatchery's requirements were transferred to other Commission hatcheries and, this year, to the Federal hatchery on Eagle Creek near Estacada.

A check on sport fishing activities in the northwestern Oregon area, revealed that no regular creel census is conducted on Big Creek as there is on some Oregon Streams. Based on frequent checks of anglers during the season, however, it was estimated that at least 50 steelhead a day were taken from a $\frac{1}{4}$ -mile section of the stream during the 3- to 4-week peak of the steelhead season. Large numbers of steelhead were also caught in other portions of the stream.

The fish culture director commented that they were well pleased with the steelhead program at the Big Creek hatchery. Heavy returns of coho indicated the Big Creek station was doing mighty well in the salmon department also. (Oregon Fish Commission, April 1, 1966.)

Note: See Commercial Fisheries Review, July 1965 p. 43.

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WILLAMETTE FALLS STEELHEAD COUNT HIGH:

It appeared certain that the spring migration of steelhead in the Willamette River in 1966 would go on the books as the best in the 16 years that the upstream-bound steelhead have been tabulated at the Willamette Falls fishway, according to the project leader of the Oregon Fish Commission's Columbia River fishery development program. As of mid-April, more than 7,000 steelhead had negotiated the ladder. The 1957 count, the closest to this year's record, was several hundred fish lower, with 5,456 steelhead actually counted. The counting is done by an observer stationed at the upper end of the fishway. He counts 50 minutes out of each hour, with a 5-minute rest period between each half-hour session. Tabulation is conducted essentially during daylight hours with some periods of night observation to provide a basis for calculating the total run. Allowances are also made for the number of fish passing during the 10 minutes of each hour the observer is off duty.

The peak of the steelhead movement this season was on April 5 and 6 when 1,073 and 1,567 steelhead, respectively, passed the falls, the project leader said. With a record high already listed as of those dates, the count was expected to continue to climb by 100-200 fish a day for two weeks more. Spring chinook movement over the falls was just starting and was expected to build up over the following few weeks to reach a peak sometime during May. High water during the March 4 to April 1 period prevented any large number of steelhead from ascending the fishway. High flows also prevented Commission personnel from reaching the counting station on the west side of the falls.

Large numbers of steelhead fry, smolts, and adults have been liberated into the system during recent years by both the Fish and Game Commissions. Although the precise degree of contribution of these efforts is not known, these plants have undoubtedly had some effect on the 1966 run, and quite possibly, have substantially supplemented naturally produced fish.

At any rate, the steelhead picture in the Willamette system was viewed as most encouraging. By the time of completion of the new Willamette Falls fishway, it was believed, there could well be a heavy traffic of steelhead to put the facility to good use. (Oregon Fish Commission, April 12, 1966.)

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INDIAN FISHERY IN COLUMBIA RIVER SURVEYED:

The Oregon State University was awarded a contract, by the U. S. Department of the Interior for a survey to determine the magnitude of the Indian fishery in the Columbia River. The \$25,000 survey is financed jointly by the Bureau of Indian Affairs and by the Bureau of Commercial Fisheries.

Approximately 1 percent of the adult chinook salmon passing Bonneville Dam were to be tagged this past spring and cash rewards of \$1 to \$50 were to be paid to Indians who caught the marked fish and returned the tags. Tagging of the salmon at Bonneville began April 1.

The extent of the Indian fishery was to be calculated from the number of tags returned.

"The purpose of the survey is to provide an accurate picture of how extensive the Indian fishery is in the Columbia River," said Dr. L. Edward Perry, Director of the Bureau of Commercial Fisheries Columbia River Program Office. The survey is part of an overall program to find out the magnitude of the non-Indian as well as the Indian fishery. The Bureau already has in operation an extensive evaluation program known as "Operation Fin Clip" to measure the contribution of fish hatcheries in that area to the total sport and commercial catch.

Under terms of the Oregon State University contract, Indians who caught tagged salmon above Bonneville Dam could collect their reward by returning the tags to a collecting station.

In order to get the reward, the Indian presenting the tag was required to state where he caught the tagged fish.

Note: See Commercial Fisheries Review, May 1966 p. 21.

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SALMON HATCHERY CONSTRUCTION CONTRACT AWARDED:

A contract to construct a salmon hatchery on the North Fork of the Nehalem River (Oregon) was awarded to a firm in Portland by the Oregon Fish Commission in late April 1966. The 15 proposals submitted to the Commission ranged from \$276,912 to \$390,648. The contract was given to the low bidder.

Under terms of the agreement the contractor will have 160 days to complete the job.

The initial project calls for construction of rearing ponds, water supply systems, egg collection facilities, a service building, and gravel roads. A second construction contract to include 3 dwellings was expected to be advertised late in June.

The new facility, not yet formally named, will be located on the south bank of the North Fork of the Nehalem River about 8 miles south of Necanicum Junction on Oregon Highway 53 in Clatsop County. Initial plans call for annual production of 1 million yearling silver (coho) and 1 million 90-day reared fall chinook.

With official approval of the construction contract, the Oregon Fish Commission adds another modern hatchery to its string of fish-production facilities. This latest salmon hatchery will pump new life into the old Nehalem, as well as help boost the offshore sport and commercial fisheries. (Oregon Fish Commission, April 15, 1966.)

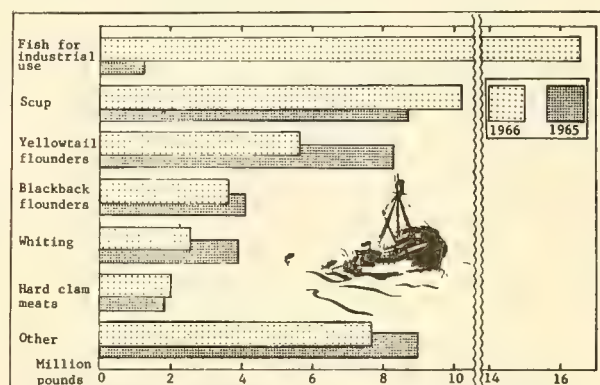


Rhode Island

FISHERY LANDINGS, 1965:

Landings of fish and shellfish at Rhode Island ports during 1965 were 48.1 million pounds valued at \$4.5 million. Compared with 1964, this was an increase of 30 percent in quantity and 20 percent in value. The catch used for industrial purposes was up 15.3 million pounds.

The catch by otter trawls, as usual, accounted for the major quantity and value of the State's landings, and in 1965 represented 75 percent of the quantity and 51 percent of the value. The otter trawl lobster catch was al-



Rhode Island landings of certain species, 1965 and 1964.

most double the quantity taken a year ago, and while representing only about 4 percent of the volume accounted for 38 percent of the total value for the 1965 otter-trawl catch. Industrial fish taken by that gear was over 15 million pounds greater than the previous year. That figure represented landings during the last 4 months of 1965 when the renovated fish meal plant at Point Judith operated.

Floating trap catches added up to another record year, the fourth in a row. Scup made up 83 percent of the total catch by floating traps. The fishery is primarily seasonal with most of the catch being made in the spring of the year. During May, 65 percent of the total 1965 trap catch was made.

Hard clam (quahog) production increased 11 percent over 1964 with the catch by hand tongs and rakers down 3 percent while dredge production was up 79 percent.

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MARINE EXPERIMENT STATION TO BE ESTABLISHED BY UNIVERSITY OF RHODE ISLAND:

The establishment of a marine experiment station within the Graduate School of Oceanography at the University of Rhode Island has been approved, announced the dean of the School, April 8, 1966. The University has been seeking state-owned land for construction of a small building which would house the station and provide quarters for an initial program in shellfish culture. Preliminary discussions were held with the Director of the Rhode Island Department of Natural Resources. It was indicated that the state would be willing to enter into an agreement to allow the University exclusive use of 200 acres of land in Jerusalem, R. I., for experimental work. Virtually all that property is marsh land and would be kept that way.

The marine experiment station will be similar in concept to the agricultural experiment stations in universities across the country which have helped make the American farmer the most productive in the world. The marine experiment station will concentrate on assisting fishermen and others who make their living from the sea, the School's dean explained.

Among the first projects will be one to grow quahogs, oysters, and clams under con-

trolled conditions in Potter and Pt. Judith Ponds. In addition, a continuing study will be made of the fish and other life in the marsh.

The station will be headed by Saul B. Salla, associate professor of oceanography who has been a member of the University of Rhode Island faculty since 1956. (University of Rhode Island, April 8, 1966.)



Salmon

U. S. PACIFIC COAST CANNED STOCKS, MARCH 1, 1966:

On March 1, 1966, canners' stocks (sold and unsold) in the United States of Pacific canned salmon totaled 1,485,947 standard cases (48 1-lb. cans)--427,833 cases less than on February 1, 1966, and 480,240 cases less than on March 1, 1965, when stocks totaled 1,966,187 standard cases.

On the basis of total stocks of 2,010,097 actual cases (consisting of cans of $\frac{1}{4}$ -lb., $\frac{1}{2}$ -lb., 1-lb., etc.), red salmon accounted for 1,315,770 cases (mostly 1-lb. and $\frac{1}{2}$ -lb. cans) or 65.5 percent of the total canners' stocks on March 1, 1966; pink salmon accounted for 365,595 cases or only 18.2 percent (227,414 cases were 1-lb. talls). Next came chum (142,969 cases, mostly 1-lb. talls), followed by coho or silver (119,342 cases), and king salmon (66,421 cases).

Table 1 - Total Canners' Stocks of Pacific Canned Salmon, March 1, 1966			
Species	Mar. 1, 1966	Feb. 1, 1966	Jan. 1, 1966
	. . . . . (No. of Actual Cases)		
King	66,421	87,321	109,284
Red	1,315,770	1,553,294	1,801,354
Coho	119,342	155,072	173,560
Pink	365,595	520,292	651,279
Chum	142,969	201,711	263,268
Total	2,010,097	2,517,690	2,998,745

Carryover stocks at the canners' level totaled 733,575 standard cases on July 1, 1965, the approximate opening date of the Pacific salmon-packing season. Adding the 1965 new season pack of 3,541,187 standard cases brought the total available supply for the 1965/66 market season to 4,274,762 standard cases.

Shipments at the canners' level of all salmon species from July 1, 1965, to March 1,

Table 2 - Total Stocks on Hand March 1, 1966 (Sold and Unsold) by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 $\frac{1}{4}$ -lb.	3,774	161,449	51,937	2,480	66	219,706
48 $\frac{1}{2}$ -lb.	58,176	455,052	42,824	128,973	33,717	718,742
48 1-lb.	4,174	695,549	19,850	227,414	104,673	1,051,660
12 4-lb.	297	3,720	4,731	6,728	4,513	19,989
Total	66,421	1,315,770	119,342	365,595	142,969	2,010,097

Table 3 - Cannery Shipments from July 1, 1965 to March 1, 1966 by Species and Can Size

Case & Can Size	King	Red	Coho	Pink	Chum	Total
	(Actual Cases)					
48 $\frac{1}{4}$ -lb.	10,426	263,599	72,901	6,013	1	352,940
48 $\frac{1}{2}$ -lb.	110,676	527,963	89,724	283,367	60,375	1,072,105
48 1-lb.	16,557	765,074	88,250	822,223	393,870	2,085,974
12 4-lb.	42	5,739	9,538	51,211	12,108	78,554
Total	137,617	1,562,375	260,413	1,162,814	466,354	3,589,573

1966, totaled 2,788,815 standard cases. The carryover of 733,575 standard cases on July 1, 1965, the beginning of the 1965/66 sales year, was substantially lower (37.6 percent) than the carryover of 1,175,588 cases a year earlier.

The 1965 U. S. pack of Pacific canned salmon (including Alaska) of 3,672,435 standard cases was 2.3 percent below the 1964 pack of 3,759,198 cases. By species, the new pack was made up of (1964 pack in parentheses): king, 130,556 standard cases (95,804); red, 2,051,667 cases (776,894); coho, 176,391 cases (219,066); pink, 998,552 cases (1,940,061); chum, 311,522 cases (724,459); steelhead, 3,747 cases (2,914).

Data on canned salmon stocks are based on reports from U.S. Pacific Coast canners who packed over 97 percent of the 1965 salmon pack. (Division of Statistics and Economics, National Canners Association, April 2, 1966.)

Note: See Commercial Fisheries Review, May 1966 p. 31.



Shellfish Farming

POTENTIAL ALONG U. S. EAST COAST:

Profitable shellfish farming can become a reality along the United States east coast within five years, according to the chairman of the University of Rhode Island's Marine Resources program. Writing in the official quarterly publication of the University's

Graduate School of Oceanography, he said this goal can be achieved through careful management backed by scientific knowledge.

The University chairman said there are about a dozen exploratory shellfish farms operating in southern New England and New York. He termed this shellfish farming "aquaculture," and said research in this area was in progress at the University of Rhode Island.



Shrimp

U. S. CONSUMPTION UP IN 1965:

U. S. consumption of shrimp in all forms was estimated at 323 million pounds (heads-off weight) in 1965, a sharp increase of 8 percent over 1964. Shrimp consumption has risen for three consecutive years, and in 1965 was 2.3 times greater than in 1950. With the increase in total consumption well above the population increase, per capita consumption rose from 1.56 pounds in 1964 to 1.67 pounds (heads-off) in 1965. Per capita consumption was 27 percent greater than the 1957-59 average.

The rise in the per capita consumption of shrimp has been much greater than that for food and all fish as a whole. In 1965, the index of per capita consumption of all food was only 1.1 percent above 1957-59, and the index for all fish was unchanged.



Fig. 1 - Shrimp being transported from landing dock to processing plant.

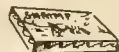
Ordinarily, the consumption of a commodity will increase with a decline in its price relative to prices of competing products. Last year was a good example: Although the price of fresh and frozen shrimp averaged 4 percent higher than 1964, the increase was less than the price rise for scallops, lobsters, spiny lobster tails, oysters, and most other shellfish. Shrimp may also have benefited from higher prices for meat products last year. Reduced supplies of meat resulted in 4 percent higher retail prices and a 2-percent per capita reduction in consumption of all meat products.



Fig. 2 - Tempting shrimp salad ready for serving.

Rising incomes have been an important factor in the postwar increase in shrimp consumption. Since 1950, for example, per capita consumption of shrimp has trended upward at a rate of 2.8 percent per year, even though the average retail price advanced at a rate of 2.25 percent per year. (U.S. De-

partment of the Interior, Bureau of Commercial Fisheries, Branch of Current Economic Analysis.)



South Carolina

FISHERIES BIOLOGICAL RESEARCH PROGRESS, JANUARY-MARCH 1966:

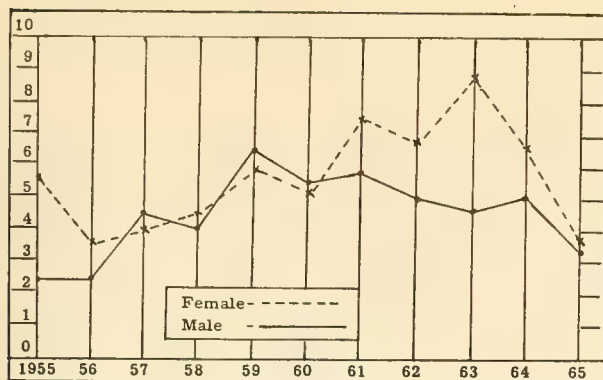
A report on the progress of biological research by the Bears Bluff Laboratories, Wadmalaw Island, S. C., for January-March 1966, follows:

Oyster Studies: The State-Federal oyster project continued to locate and chart subtidal oyster beds, and has very carefully charted 45 linear miles in Colleton, Charleston, and Berkeley Counties. Transplanting of seed oysters from deep-water beds in the Wando River to the Stono and Ashepoo Rivers was carried out during the quarter. Detailed studies of small creeks in the vicinity of McClellanville, to which oysters have been successfully transplanted in the past, were studied in order to try to determine the environmental factors which may control successful transplanting. Quite a number of bottom samples were sent to the State Geologist for analyses.

A repeat survey of 8 stations in the vicinity of Folly River was completed. Those stations were surveyed in 1960 and in 1961, and now in 1966. Comparison of the surveys show that the total number of all sized oysters found in one square yard has steadily declined. The percentage of oysters in each size group has changed. In the 1960 and 1961 surveys small oysters (seed and canning stock) made up about 70 percent of the total population. In 1966, only 50 percent of the oysters were in this size group. This may indicate either heavy harvesting of this size oyster or a lack of recruitment. In 1960 and in 1961, the 2- to 3-inch size oysters made up 20 percent of the oysters taken in sampling. In 1966 this ratio increased to 35 percent. The most striking change occurred in the large (usually single) oysters 3 inches or more in length. The populations in 1960 and in 1961 contained only 6 percent and 7 percent, respectively, of that size. However, in 1966 there were 16 percent of the oysters of that size. Apparently these larger oysters are being underharvested.

Pesticides: The pesticide monitoring program showed that the DDT residuals in fish were 86 percent higher in January and February than during the previous quarter. Dieldrin residuals showed even a higher increase than DDT. Four of the 5 sampling stations which showed this accretion were in the Charleston Harbor area. Oysters were not contaminated by Dieldrin or DDT, except those which were taken from the Ashley River.

Crab Studies: In 10 years of experimental trawling throughout the States, 38,678 crabs were taken in 1,920 tows, according to a study completed in this quarter on available crab information at Bears Bluff Laboratories. The accumulated data show that the sex ratio on these crabs was 77 males to 100 females. Fluctuations in the relative abundance of blue crabs throughout South



Relative abundance of mature male and female blue crabs at 18 regular experimental stations throughout South Carolina, 1955-65.

Carolina as determined by this study are shown in detail (see fig.).

Sampling population densities by the use of crab pots in three different areas of the State, but which were comparable in general physical characteristics, showed that the same amount of effort (i.e. the same number of pots, set the same length of time, using the same type of bait, in approximately the same depth of water) yielded the highest catch in the central, or

date, shrimp were found to be fairly abundant in the ocean just off the mouth of the river, where the water temperature was 44.6° F. But within a few days, white shrimp became scarce at all sampling locations.

The extent of the effect of the cold wave on the white shrimp population is not known with certainty, but a few dead shrimp were found in the Charleston Harbor area in February, and several reports were made of shrimp being killed by cold in small creeks. Even though the three-month average catch for white shrimp (see table) was considerable higher this year than in 1965 (due to the high January catch) the abundance of these shrimp in February and March of 1966 was much lower than in 1965. During February the average catch per unit of effort for white shrimp dropped to about 5.0 and in March it declined to 2.0, whereas in 1965 during the same two months the average CPUE was 8.0 and 11.0.

The fact that some shrimp still remain in coastal waters is encouraging, but the outlook for white shrimp is not nearly as promising as it was earlier.

Spot and croaker were less plentiful in experimental trawling during January-March 1966 as compared with the same period of 1965 (see table). Judging from the numbers of postlarvae of those fish in plankton collections made so far in 1966, it appears that both species had successful spawning seasons this past winter and will be quite abundant later on in the year.

Average Catch Per Unit of Effort of Commercial Species at Regular Survey Stations, January-March 1962-1966

Year	Spot	Croaker	White Shrimp				Blue Crab	
			Jan.	Feb.	Mar.	3 Mos.	Mature	Immature
1966	2.9	4.1	228.6	5.3	2.0	78.8	6.9	6.2
1965	7.2	5.7	28.7	8.0	10.9	15.7	6.2	12.0
1964	0.7	9.5	0.3	0.0	0.0	0.1	3.2	9.4
1963	7.9	10.2	9.6	0.0	0.0	3.2	8.1	8.6
1962	22.1	18.6	23.4	35.8	19.1	26.3	14.1	23.9

Price Inlet area. The northern or Murrells Inlet area produced only 80 percent as much and the Harbor River, or southern area, yielded only 36 percent of the number caught in the Price Inlet area. This type of population sampling will continue in those three areas for 12 months and may give general information on the three regions, which differ considerably as to fishing pressure.

According to information obtained by experimental trawling throughout the State by the research vessel, adult blue crabs were of about the same abundance in experimental trawling during January-March 1966 as in the same quarter of 1965 (see table). Immature blue crabs, however, were only about one half as numerous during the quarter as in 1965. This may be due to the lower water temperatures observed this year. By late March the numbers of both immature and mature blue crabs began to increase with rising water temperatures.

Shrimp Studies: Small white shrimp were very plentiful throughout coastal waters during January 1966, and an average catch of over 225 in each 20-minute drag with a 20-foot net was recorded at regular survey stations. During the last week of January, however, a sudden cold wave sent air temperatures down to 11° F., and water temperatures in sounds and rivers dropped into the low 40's. On January 31, water temperature was 41° F. in the North Edisto River and almost no shrimp were found there. On the same

Brown shrimp postlarvae began to enter coastal waters somewhat later this year than in 1965, and it was mid-February before they began to show up in plankton collections. Lower water temperatures during the past winter are quite possibly responsible for the later appearance of these postlarvae this year. Peak abundance of postlarval brown shrimp as of this quarter occurred from middle to late March, and additional recruitment during April was expected.

Pond Cultivation: During the extreme cold spell which occurred in late January and early February 1966, a fish kill took place in a 2½-acre experimental pond. The water temperature at the time of the kill was 33.4° F. Most of the winter trout and croaker in the pond succumbed to cold, but some spot and practically all of the channel bass in the pond revived when temperatures rose a few days later. Most of the channel bass were 2- to 3-year old fish ranging in length from 18-27 inches. Mortality among mullet and flounder in the pond was also negligible.

Two experimental shrimp ponds of $\frac{1}{10}$ and 1 acre in size were drained and treated with triple superphosphate fertilizer at the rate of 40 pounds P_2O_5 per acre. This was done to determine whether added phosphate will increase the productivity of shrimp in ponds. In a preliminary experiment conducted in heated concrete tanks during the quarter, the mud bottom of one tank was treated with phosphate fertilizer, and the other was kept untreated. Both tanks were stocked with small

white shrimp which were fed the equivalent of 2,500 pounds of food per acre during a 2½-month period. Although growth was not extraordinary in either tank, the mortality in the phosphate treated tank was much less than in the untreated control. Reduced mortality through the use of fertilizers has been reported for fish in brackish water ponds in the Far East, and results indicate that the same may hold true for shrimp in ponds.

Note: See Commercial Fisheries Review, March 1966 p. 34.



Tuna

ECONOMIC STUDY OF TUNA FISHING BY U.S. BUREAU OF COMMERCIAL FISHERIES:

Recent changes in the efficiency and composition of the California-based tuna fishing fleet, along with the trend toward building more and larger tuna purse seiners has pointed up the need for a detailed analysis of the economics of United States tuna fishing in the eastern tropical Pacific Ocean. Such an analysis entitled "Costs and Earnings of Tropical Tuna Vessels Based in California" has been published in Fishery Industrial Research, Vol. 3, No. 1, a publication of the U.S. Department of the Interior's Bureau of Commercial Fisheries.

The study was made by a fishery biologist of the Bureau's Tuna Resources Laboratory, La Jolla California, in collaboration with an analyst of a California tuna-packing firm who was formerly associated with the Inter-American Tropical Tuna Commission.

The authors present a method of estimating earnings of various size purse seiners in the size range of 100- to 500-ton capacity, under any prevailing catch rate and price structure for yellowfin and skipjack tuna. Earnings are examined from the standpoints of both vessel owner and crew.

Costs of operation for a substantial portion of the California-based tuna fleet obtained by the authors were broken down into individual categories, and examined in each category in relation to vessel size. These were then recombined according to vessel size, with other information relating directly to vessel income. The income data included the varying prices and catch rates for tuna, relative efficiency of different sizes of vessels, average days at sea per year, average capacity filled, and the average proportions of the two species in the annual catch; again related to vessel size. Using these data, the article shows in considerable detail how estimations

of earnings may be made, using as inputs the size of the vessel, the current catch rate, and the current prices for tuna.

Among other things, estimations of this type may be used to determine the optimum size of a purse seiner. According to the authors, the optimum size varies somewhat with catch rates and prices, but, under recent conditions and in the size range considered, optimum size appears to be in the range from 350- to 500- ton capacity.

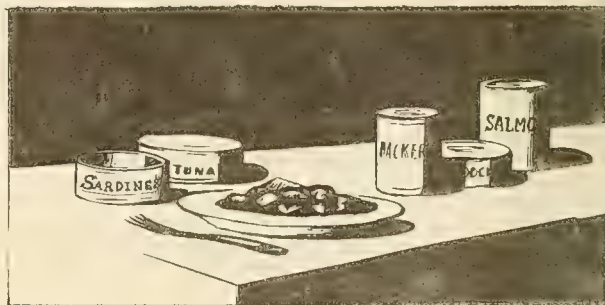
The study has already proved to be of considerable interest to the fishing industry.



United States Fisheries

FISH CONSUMPTION IN 1965 HIGHEST IN TEN YEARS:

Preliminary data for 1965 indicate that per capita consumption in the United States of commercially-caught fish and shellfish amounted to 11.0 pounds, edible weight--up from 10.5 pounds in 1964 and 10.6 in 1963. The 1965 per capita fish consumption was



the highest since 1954 when 11.2 pounds were consumed at considerably lower prices. The increased consumption did not occur because of lower prices, as the 1965 retail fish price index was at its highest level at 110.6. The retail fish price index was 95.8 in 1954 and 107.4 in 1964. The increased consumption in 1965 resulted largely from a greater consumption of canned fishery products--4.4 pounds in 1965 compared with 4.1 in 1964. The consumption of fresh and frozen fishery products in 1965 amounted to 6.1 pounds per person--up 0.2 pounds from a year earlier. Cured products were consumed at the rate of ½-pound per person, the same as in 1964. Part of the increased consumption came from decreases in some storage stocks. (U. S. Department of the Interior, Bureau of Com-

mercial Fisheries, Branch of Current Economic Analysis.)

* * * * *

1963 CENSUS OF COMMERCIAL FISHERIES:

Gross receipts of U.S. commercial fishing operators amounted to \$339 million in 1963, according to a survey by the Bureau of the Census, U.S. Department of Commerce.

The 1963 Census of Commercial Fisheries, conducted by the Census Bureau in cooperation with the Bureau of Commercial Fisheries, U. S. Department of the Interior, is the first survey since 1908.

There were 23,249 operators engaged in commercial fishing in 1963. Of that total, 13,998 had no paid employees. The remaining 9,251 operators had 20,300 employees with a 1963 payroll of \$102 million. Only 82 had 20 or more paid employees and only 3 had more than 100.

The Pacific area with 8,601 operators and gross receipts of \$128.5 million, topped the nation. In second place was the South Atlantic area with 6,338 operators and gross receipts of \$65 million, followed by the New England area with 3,199 operators and gross receipts of \$56 million.

There were 10,666 vessels engaged in commercial fishing in 1963, of which 8,095 were 30-59 feet in length. Only 196 exceeded 120 feet.

* * * * *

LANDINGS AND VALUE OF COMMERCIAL FISHERIES HIGHER IN 1965:

United States fishery landings in 1965 totaled 4.7 billion pounds (4 percent higher than in 1964) with a record ex-vessel value of \$451 million--almost 16 percent more than the \$390 million value in 1964, the U. S. Department of the Interior's Bureau of Commercial Fisheries said. Per capita consumption of fishery products in the United States of 11.0 pounds was one-half pound more than in 1964. Most of the gain was attributed to tuna.

The United States remained fifth among the world's fishing nations, led by Peru, Japan, Mainland China, and the Soviet Union in that order. For the first time the United States imported (principally from Canada, Japan, Mexico, Peru, Iceland, and Norway)

more than half its supply of edible fishery products.

Shrimp was again the most valuable species--the 1965 catch had an ex-vessel value of \$82 million. The salmon catch was valued at \$67 million, and tuna at \$42 million.



Fig. 1 - Heading of shrimp aboard a fishing vessel.

New catch records were set for Atlantic and Pacific flounders, spiny lobsters, blue crabs, and Alaska king crabs. Spiny lobsters are the source of what many consumers purchase as "lobster tails." The increase in the catch of Alaska king crab was greater than the total catch of that species just five years ago.

Menhaden (an inedible species), which is made into fish meal and used for poultry feed, oil, and other commercial products, was again the most abundant fish taken by United States



Fig. 2 - Menhaden being conveyed on belt system from the hold of a vessel to the cookers of a reduction plant on the east coast of the United States.

fishermen, accounting for 36 percent of the total catch (or 1.7 billion pounds).

Declines were noted in several species, among them mackerel taken off the coast of California, and Atlantic ocean perch. Sardines--at one time the largest fishery with well over a billion pounds landed annually--virtually disappeared from waters off the Pacific Coast.

The Nation's oyster industry also declined. The 54-million-pound catch in 1965 was down 6.7 million pounds from 1964 and was the lowest on record; oyster landings were up in Maryland, but down sharply in New Jersey, Virginia, Alabama, Mississippi, and Louisiana.

Louisiana again led all states in the volume of catch in 1965--794 million pounds--followed by Alaska, Virginia, California, and Massachusetts. Menhaden accounted for a large part of the Louisiana landings.

Alaska continued to lead all states in value of catch--\$72 million--followed by California, Massachusetts, and Louisiana. Salmon and king crab made up a major portion of the Alaska catch.

Note: See Commercial Fisheries Review, April 1965 p. 38.



U. S. Fishing Vessels

FISHERIES LOAN FUND AND OTHER FINANCIAL AID FOR VESSELS, JANUARY 1-MARCH 31, 1966:

From the beginning of the program in 1956 through March 31, 1966, a total of 1,792 applications for \$45,695,111 was received by the Bureau of Commercial Fisheries, U. S. Department of the Interior, the agency administering the Federal Fisheries Loan Fund. By that date, 930 applications (\$20,239,076) had been approved, 575 (\$13,323,939) had been declined or found ineligible, 242 (\$8,730,158) had been withdrawn by the applicants before being processed, and 45 (\$1,338,599) were pending. Of the applications approved, 338 were approved for amounts less than applied for--the total reduction was \$2,063,339.

The following loans were approved from January 1, 1966, through March 31, 1966:

New England Area: Sigvald Osmundsen, Rio Grande, New Jersey, \$9,000.

South Atlantic and Gulf Area: Merlin, Inc., Port Isabel, Texas, \$32,200.

California Area: Walter T. Cramer, Eureka, \$47,154; Walter E. Wallin, Eureka, \$22,000; Henry R. Endly, Jr., Morro Bay, \$18,374; Trans World Marine, Inc., San Diego, \$3,000; Arthur O. Baade, San Pedro, \$4,664.

Pacific Northwest Area: Donald M. Hall, Astoria, Oreg., \$11,500; Frank Parker and Eben Parker, Jr., Astoria, Oreg., \$21,140; Paul C. Smith, Newport, Oreg., \$16,000; Frank W. Phillips, North Bend, Oreg., \$3,500; Arthur F. Todenhoft, Aberdeen, Wash., \$8,500; Hubert J. Brabant, Blaine, Wash., \$10,000; Thane B. Ohler, Blaine, Wash., \$7,000; Rodney Hurd and Ralph B. Peyton, Mountlake Terrace, Wash., \$47,163; Jack J. Childers, Port Angeles, Wash., \$15,000; Joe A. Nevaril, Port Angeles, Wash., \$9,860; Bert A. Bender, Seattle, Wash., \$5,200; Arnold O. Jangord, Seattle, Wash., \$8,667; Donald D. Knutsen, et al, Seattle, Wash., \$25,500; Oceanus, Inc. Seattle, Wash., \$20,000.

Alaska: Jerry R. Peterson and John W. Weber, Anchorage, \$28,000; Kenneth R. Lyon, Homer, \$1,500; Wayne A. Murphy and Charles H. Nims, Homer, \$68,000; Leight Sydney Wright, Hoonah, \$4,000; Harry T. Brensdal, Juneau, \$4,500; Charles R. Leshner, Juneau, \$14,000; Jack Williford, Kenai, \$10,000; George R. Hippert, Ketchikan, \$5,000; Lee G. Andrich, Kodiak, \$92,000; Howard Ulrich, Pelican, \$4,000; Robert J. Leekley, Petersburg, \$33,000; Aril T. Mathisen, Petersburg, \$9,500; Andrew J. Barlow, Jr., Wrangell, \$8,000.

Under the Fishing Vessel Mortgage Insurance Program (also administered by the Bureau) during the first quarter of 1966, a total of 15 applications for \$1,157,750 was received. Since the program began (July 5, 1960) 109 applications were received for \$9,722,245. Of the total, 79 applications were approved for \$5,709,076 and 18 applications for \$2,223,550 were pending as of March 31, 1966. Since the mortgage insurance program began, applications received and approved by area are:

New England Area: Received 15 (\$1,796,750), approved 10 (\$1,217,178).

California Area: Received 2 (\$1,262,000), approved 2 (\$1,262,000).

South Atlantic and Gulf Area: Received 72 (\$4,160,524), approved 56 (\$2,585,539).

Pacific Northwest Area: Received 13 (\$2,127,375), approved 7 (\$579,585).

Alaska Area: Received 7 (\$375,596), approved 4 (\$64,774).

The first applications for a Fishing Vessel Construction Differential Subsidy under the Bureau's expanded program were received in December 1964. Through March 31, 1966, a total of 66 applications for \$15,488,500 was received. Public hearings on 42 applications were completed during that period and 15 invitations to bid on a vessel were sent out.

Note: See Commercial Fisheries Review, February 1966 p. 39.

* * * * *

DOCUMENTATIONS ISSUED AND CANCELLED, YEAR 1965:

During 1965, a total of 663 vessels of 5 net tons and over was issued first documents as fishing craft, as compared with 503 in 1964. There were 422 documents can-

Table 1 - U. S. Fishing Vessels--Documents Issued by Tonnage and Area, Year 1965 2/

Gross Tonnage	New England	Middle Atlantic	Chesapeake	South Atlantic	Gulf	Pacific	Great Lakes	Puerto Rico	Total
(Number).									
5-9	7	2	33	10	51	30	-	-	133
10-19	9	2	17	10	72	76	1	1	188
20-29	1	1	3	8	18	23	1	-	55
30-39	2	1	-	3	8	6	-	-	20
40-49	-	5	-	5	13	11	-	-	34
50-59	-	-	-	3	5	7	-	-	15
60-69	-	-	-	2	21	4	-	-	27
70-79	2	1	-	2	11	3	-	-	19
80-89	-	-	-	2	24	-	-	-	26
90-99	1	1	-	29	60	1	-	-	92
100-109	-	1	-	2	6	-	-	-	9
110-119	1	-	-	1	-	-	-	-	2
120-129	1	-	-	-	-	-	-	-	2
130-139	2	-	-	-	-	1	-	-	3
140-149	1	-	-	-	-	-	-	-	1
150-159	4	-	-	-	-	-	-	-	4
160-169	2	-	-	-	1	-	-	-	3
170-179	4	-	-	-	-	-	-	-	4
180-189	-	-	-	-	-	1	-	-	1
190-199	1	-	-	-	-	1	-	-	2
210-219	-	-	-	-	-	1	1	-	2
260-269	-	-	-	-	-	1	-	-	1
270-279	-	-	-	-	-	1	-	-	1
300-309	-	-	-	-	-	1	-	-	1
310-319	-	-	-	-	-	1	-	-	1
320-329	-	-	-	-	-	1	-	-	1
330-339	-	-	-	-	-	1	-	-	1
360-369	-	-	-	-	2	-	-	-	2
420-429	-	-	-	-	-	1	-	-	1
430-439	-	-	-	-	-	1	-	-	1
510-519	-	-	-	-	2	-	-	-	2
520-529	-	-	-	-	3	-	-	-	3
550-559	-	-	-	-	1	-	-	-	1
570-579	-	-	1	-	-	-	-	-	1
580-589	-	-	1	-	-	-	-	-	1
590-599	-	-	1	-	-	1	-	-	2
720-729	-	-	-	-	-	1	-	-	1
Total	38	14	56	77	299	175	3	1	663

Note: For explanation of footnotes, see table 4.

Table 2 - U. S. Fishing Vessels--Documents Issued by Vessel Length and Area, Year 1965 2/

Length in Feet	New England	Middle Atlantic	Chesapeake	South Atlantic	Gulf	Pacific	Great Lakes	Puerto Rico	Total
(Number).									
20-29	3	-	1	5	19	42	-	-	70
30-39	11	4	41	18	97	70	1	1	243
40-49	5	1	11	6	31	37	-	-	91
50-59	-	5	-	11	23	6	1	-	46
60-69	2	3	-	35	117	6	-	-	163
70-79	8	1	-	1	2	1	-	-	8
80-89	7	-	-	-	1	1	-	-	9
90-99	6	-	-	1	1	1	-	-	9
100-109	1	-	-	-	-	1	-	-	2
110-119	-	-	-	-	-	3	1	-	4
120-129	-	-	-	-	-	2	-	-	2
130-139	-	-	-	-	2	2	-	-	4
150-159	-	-	-	-	-	2	-	-	2
160-169	-	-	1	-	6	1	-	-	8
200-209	-	-	2	-	-	-	-	-	2
Total	38	14	56	77	299	175	3	1	663

Note: For explanation of footnotes, see table 4.

Table 3 - U. S. Fishing Vessels 1/--Documentations Issued and Cancelled, by Areas, Year 1965 with Comparisons

Area (Home Port)	1965	1964
(Number).		
Issued first documents 2/:		
New England	38	33
Middle Atlantic	14	11
Chesapeake	56	39
South Atlantic	78	50
Gulf	298	221
Pacific	175	141
Great Lakes	3	4
Hawaii	-	2
Puerto Rico	1	2
Total	663	503
Removed from documentation 3/:		
New England	33	53
Middle Atlantic	21	27
Chesapeake	32	29
South Atlantic	84	62
Gulf	131	106
Pacific	98	151
Great Lakes	20	14
Hawaii	2	-
Puerto Rico	1	-
Total	422	442

Note: For explanation of footnotes, see table 4.

Table 4 - U. S. Fishing Vessels--Documents Issued by Horsepower and Area, Year 1965 2/

Horsepower	New England	Middle Atlantic	Chesapeake	South Atlantic	Gulf	Pacific	Great Lakes	Puerto Rico	Total
(Number).									
Under 50	-	-	2	-	1	4	-	-	7
50-99	3	1	3	4	36	20	-	-	67
100-149	7	1	16	8	56	45	-	-	133
150-199	-	7	8	13	61	48	-	-	137
200-249	4	1	10	11	52	17	-	1	96
250-299	2	-	7	2	5	13	-	-	29
300-349	-	2	1	32	68	10	-	-	117
350-399	4	-	4	3	3	3	-	-	13
400-449	8	2	-	-	1	1	1	-	13
450-499	1	-	-	2	5	4	-	-	12
500-599	5	-	1	2	1	2	1	-	12
600-699	2	-	1	-	2	3	-	-	8
700-799	2	-	-	-	-	-	-	-	2
800-899	-	-	-	-	-	2	1	-	3
1,000-1,099	-	-	1	-	-	1	-	-	2
1,300-1,399	-	-	-	-	-	1	-	-	1
1,450-1,499	-	-	-	-	1	-	-	-	1
1,500 over	-	-	2	-	6	1	-	-	9
Total	38	14	56	77	299	175	3	1	663

1/Includes both commercial and sport fishing craft. A vessel is defined as a craft of 5 net tons and over.

2/There were 51 redocumented vessels in 1965 previously removed from the records. Vessels issued first documents as fishing craft were built: 428 in 1965; 33 in 1964; 8 in 1963; 5 in 1962; 3 in 1961; 4 in 1960; 31 in 1959-59; 141 prior to 1959, 10 unknown.

3/Includes vessels reported lost, abandoned, forfeited, sold alien, etc.

Source: Monthly Supplement to Merchant Vessels of the United States, Bureau of Customs, U. S. Treasury Department.

celled for fishing vessels in 1965 as compared with 442 in 1964.



U.S. Foreign Trade

IMPORTS OF CANNED TUNA IN BRINE UNDER QUOTA:

United States imports of tuna canned in brine during January 1-April 2, 1966, amounted to 17,608,572 pounds (about 838,503 standard cases), according to preliminary data compiled by the Bureau of Customs, U.S. Treasury Department. That was considerably more than the 5,631,316 pounds (about 268,158 standard cases) imported during January 1-April 3, 1965.

The quantity of tuna canned in brine which can be imported into the United States during the calendar year 1966 at the 12½-percent rate of duty is limited to 65,662,200 pounds (or about 3,126,771 standard cases of 48 7-oz. cans). Any imports in excess of that quota will be dutiable at 25 percent ad valorem.

In 1965, the quota was 66,059,400 pounds (or about 3,145,685 standard cases). The total imports for that year were below the quota set. (See p. 108 of this issue.)



Washington

SALMON FISHING REGULATIONS FOR 1966 IN GRAYS AND WILLAPA HARBORS PROPOSED:

Proposed regulations for commercial salmon fishing in Grays and Willapa Harbors during 1966 were discussed at a public hearing held in Olympia, Wash., April 16, 1966, by the Washington State Department of Fisheries.

The current aims of the management of coastal salmon stocks, toward which the proposed regulations were directed, include the maintenance of the present level of fishing intensity and catch-to-escapement balance on the following stocks: 4- and 5-year old Grays Harbor fall chinook; early-run Grays Harbor coho; 4- and 5-year old Willapa Bay chinook and Willapa Bay coho, the State's Fisheries Director said.

Proposals called for a reduction in fishing intensity on Grays Harbor chums to allow adequate escapement.

Increases in fishing intensity, to allow additional harvest, were proposed for 3-year-old Grays Harbor and Willapa Bay fall chinook (predominately males); early-run Grays Harbor fall chinook (Satsop-Chehalis runs); late-run Grays Harbor coho and Willapa and North River coho.

One miscellaneous regulation was proposed to make lawful for the entire year the taking and possession for commercial purposes of hard-shell clams. A statute provides that hard-shell clams may be taken commercially only from licensed clam farms; obviously a clam farmer would refrain from harvesting his clams during spawning time, so there is no need for a closed season, as is presently called for, on Puget Sound east of Dungeness Spit or in Grays or Willapa Harbors.

The regulation proposals and aims were sent fishermen and organizations concerned with the Grays and Willapa Harbors salmon fisheries and written comments were invited.

Following public comment on the proposal, regulations were to be adopted at another public hearing to be held later. (Washington State Department of Fisheries, April 1, 1966.)

* * * * *

SALMON FISHING REGULATIONS FOR PUGET SOUND IN 1966 ADOPTED:

Commercial salmon fishing regulations for Puget Sound for 1966 were adopted at a public hearing held in Olympia, Wash., March 29, 1966, by the Washington State Department of Fisheries. Regulations are similar to those of 1965, and are the same as those proposed at a previous hearing in Seattle with some exceptions.

Included in the changes made were: (1) A new commercial salmon fishing preserve was created in Gig Harbor; (2) The minimum size limit for commercially-caught coho salmon in Puget Sound net fisheries was changed from 22 inches to 16 inches to crop mature coho that are under 22 inches; (3) A partial opening of the Samish Bay Salmon Preserve during the fall chinook season to crop the abundant returns of hatchery-reared chinook in that area; and (4) The chum salmon fisheries will be closed from October 23 to November 30 in all areas except portions of areas

4A and 6 lying southerly of a line drawn from Liplip Point on Marrowstone Island to Double Bluff buoy on Whidbey Island and to the Point Weels flashing red range lights. This was done to protect dwindling chum runs in northern Puget Sound.

Some species were added to the foodfish list and some deleted, and regulations of the International Pacific Salmon Commission and International Halibut Commission concerning Washington catches were also adopted. (Washington State Department of Fisheries, March 29, 1966.)



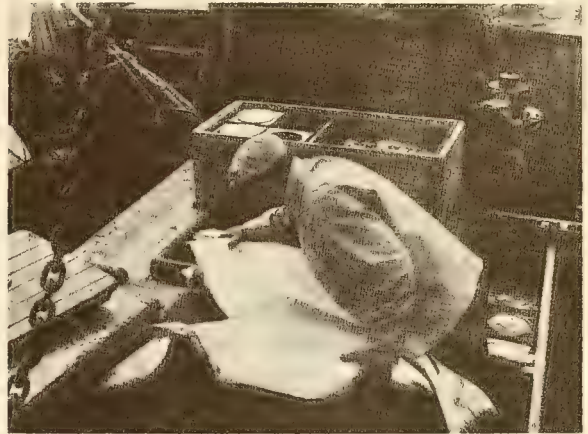
Wholesale Prices

EDIBLE FISH AND SHELLFISH, APRIL 1966:

The April 1966 wholesale price index for edible fishery products (fresh, frozen, and canned) was down 0.2 percent from the previous month. April prices were somewhat mixed--lower or about unchanged for some items but higher for several products including

shrimp. At 126.5 percent of the 1957-59 average, the overall index this April was 16.3 percent higher than the same month a year earlier. With very few exceptions, prices were higher for nearly all items than in April 1965.

The subgroup index for drawn, dressed, or whole finfish was down 1.6 percent from March



Dressed halibut being stored in ice in a vessel's hold.

Wholesale Average Prices and Indexes for Edible Fish and Shellfish, April 1966 with Comparisons

Group, Subgroup, and Item Specification	Point of Pricing	Unit	Avg. Prices 1/ (\$)		Indexes (1957-59=100)			
			Apr. 1966	Mar. 1966	Apr. 1966	Mar. 1966	Feb. 1966	Apr. 1965
ALL FISH & SHELLFISH (Fresh, Frozen, & Canned)					126.5	126.7	123.2	108.8
<u>Fresh & Frozen Fishery Products:</u>					125.0	125.3	124.9	113.3
<u>Drawn, Dressed, or Whole Finfish:</u>					116.6	118.5	123.7	111.0
Haddock, lge., offshore, drawn, fresh	Boston	lb.	.12	.12	92.0	89.8	111.3	69.5
Halibut, West., 20/80 lbs., drsd., fresh or froz.	New York	lb.	.48	.48	140.5	140.5	139.0	119.8
Salmon, king, lge. & med., drsd., fresh or froz.	New York	lb.	.86	.87	120.5	121.2	122.3	115.3
Whitefish, L. Superior, drawn, fresh	Chicago	lb.	.53	.71	78.3	105.9	108.2	126.9
Yellow pike, L. Michigan & Huron, rnd., fresh	New York	lb.	.85	.85	139.1	139.1	139.1	163.7
<u>Processed, Fresh (Fish & Shellfish):</u>					130.1	129.4	130.5	114.5
Filletts, haddock, sml., skins on, 20-lb. tins . .	Boston	lb.	.40	.39	97.2	94.8	109.3	85.0
Shrimp, lge. (26-30 count), headless, fresh . .	New York	lb.	1.10	1.05	128.9	123.0	123.0	117.2
Oysters, shucked, standards	Norfolk	gal.	8.13	8.50	137.0	143.3	143.3	115.9
<u>Processed, Frozen (Fish & Shellfish):</u>					123.0	122.8	116.0	109.5
Filletts: Flounder, skinless, 1-lb. pkg.	Boston	lb.	.43	.42	109.0	106.4	106.4	93.8
Haddock, sml., skins on, 1-lb. pkg.	Boston	lb.	.39	.39	112.9	114.3	117.3	108.5
Ocean perch, lge., skins on 1-lb. pkg.	Boston	lb.	.32	.32	112.2	112.2	112.2	105.2
Shrimp, lge. (26-30 count), brown, 5-lb. pkg.	Chicago	lb.	1.09	1.09	129.2	128.6	115.6	111.5
<u>Canned Fishery Products:</u>					129.6	129.6	120.7	101.2
Salmon, pink, No. 1 tall (16 oz.), 48 cans/cs. . .	Seattle	cs.	28.50	28.50	124.2	124.2	124.2	88.3
Tuna, lt. meat, chunk, No. 1/2 tuna (6-1/2 oz.), 48 cans/cs.	Los Angeles	cs.	14.85	14.85	131.8	131.8	112.1	101.6
Mackerel, jack, Calif., No.1 tall (15 oz.), 48 cans/cs.	Los Angeles	cs.	7.63	7.63	129.3	129.3	120.9	120.9
Sardines, Maine, keyless oil, 1/4 drawn (3-3/4 oz.), 100 cans/cs.	New York	cs.	10.25	10.25	131.5	131.5	131.5	131.5

1/Represent average prices for one day (Monday or Tuesday) during the week in which the 15th of the month occurs. These prices are published as indicators of movement and not necessarily absolute level. Daily Market News Service "Fishery Products Reports" should be referred to for actual prices.

Source: U. S. Department of Labor, Bureau of Labor Statistics.

to April. Prices at Chicago for Lake Superior fresh whitefish (down 26.1 percent) were sharply lower than in March when low supplies brought considerably higher prices, together with slightly lower prices for western frozen king salmon (down 0.6 percent). The lower prices were partly offset by slightly higher prices at Boston for ex-vessel large haddock. Prices remained unchanged from the previous month for western frozen dressed halibut and Great Lakes fresh yellow pike at New York City. Compared with April 1965, prices this April were higher by 5.0 percent. Prices were higher for nearly all items in the subgroup. The exceptions were lower prices for Great Lakes whitefish (down 38.3 percent) at Chicago and yellow pike (down 15.0 percent) at New York City.

The April 1966 subgroup index for processed fresh fish and shellfish rose 0.5 percent from the previous month. Prices this April were higher than in March for fresh haddock fillets (up 2.5 percent) at Boston and fresh shrimp (up 4.8 percent) at New York City, but were lower for standard shucked oysters (down 4.4 percent) at Norfolk. As compared with the same month a year earlier, the subgroup index this April was higher by 13.6 percent. Prices were considerably higher than in April 1965 for all items in the subgroup.

The processed frozen fish and shellfish subgroup index rose only slightly (up 0.2 percent) from March to April. April prices for frozen flounder fillets at Boston were higher by 2.4 percent and frozen shrimp at Chicago rose 0.5 percent from the previous month. Prices for small haddock fillets at Boston this April were lower by 1.2 percent but for ocean perch fillets they remained unchanged. The subgroup index this April was 12.3 percent higher than in the same month in 1965 because of generally higher prices--substantially higher for flounder fillets (up 16.2 percent) and frozen shrimp (up 15.9 percent).

Prices for all canned fishery products were unchanged from March to April 1966. Market conditions were steady to firm and stocks of several products were low. But compared with the same month a year earlier, the index this April was up 28.1 percent. Prices were higher than in April 1965 for canned pink salmon (up 40.7 percent), canned tuna (up 29.7 percent), and California jack mackerel (up 6.9 percent). Prices for canned Maine sardines remained unchanged for for each of the months indicated. (U. S. Department of the Interior, Bureau of Commercial Fisheries, Market News Service.)



WAYWARD DRIFT BOTTLE RETURNS AFTER 40 YEARS

A record of some sort was established recently when the Woods Hole Oceanographic Institution (Massachusetts) was notified of the recovery of a drift bottle that had been launched into the ocean nearly 40 years ago.

A drift bottle is one of the oldest and simplest means of measuring ocean currents. It consists of a corked glass bottle with a card inside. The position and date of release are recorded and the card asks the finder to report the date and location of recovery. From hundreds of returns, a picture of the surface circulation can be drawn.

Most of the bottles that are recovered turn up in a few weeks or months. Number 1456, however, was released by the U. S. Bureau of Fisheries vessel *Halcyon* on July 12, 1922, about 120 miles east of the entrance to Delaware Bay. It was found on February 20, 1962, on the beach at Oregon Inlet, N. C., some 220 miles from the release point. It was probably buried in the shifting sands for 40 years, according to a Woods Hole oceanographer. (*Sea Secrets*, Vol. 6, No. 9, October 1962.)



FOREIGN

International

FISH MEAL

WORLD PRODUCTION, 1965 AND JANUARY-FEBRUARY 1966 WITH COMPARISONS:

World fish meal production in 1965 showed a small decline from the previous year due to a drop in the anchoveta catch off South America. Peruvian output was down 17 percent and Chilean production dropped sharply. The decline was partly offset by heavy production in Norway and Iceland where fishermen landed large catches of herring in 1965. Production of fish meal was also up in Canada, South Africa, the United Kingdom, and the United States.

World Fish Meal Production, 1965 and Jan.-Feb. 1966 with Comparisons				
Country	Jan.-Feb.		Jan.-Dec.	
	1966	1965	1965	1964
.....(Metric Tons).....				
Canada	13,965	14,674	90,387	66,200
Denmark	13,291	14,816	111,189	109,687
France	2,200	2,200	13,200	13,200
German Fed. Repub.	12,912	10,178	67,555	73,900
Netherlands	1/	638	5,894	7,980
Spain	1/	4,959	2,13,247	35,407
Sweden	426	1,657	7,076	7,600
United Kingdom	15,756	15,036	80,845	74,813
United States	3,990	4,399	229,807	213,417
Angola	9,679	12,603	47,668	59,701
Iceland	12,830	9,167	172,073	127,739
Norway	32,585	24,608	309,149	185,901
Peru	421,710	316,389	1,282,011	1,552,214
So. Afr. (including S.-W. Afr.)	21,681	31,456	272,388	257,440
Belgium	750	750	4,500	4,500
Chile	60,541	23,745	70,352	144,456
Morocco	1/	1/	3/19,290	18,450
Total	622,316	487,275	2,796,631	2,952,605

1/Data not available.

2/Data available only for January-May 1965.

3/Data available only for January-November 1965.

Note: Japan does not report fish meal production to the International Association of Fish Meal Manufacturers at present. Japanese production of fish meal in 1964 was reported as 423,700 metric tons by the Food and Agriculture Organization.

World fish meal production in January-February 1966 was up 28 percent from the same period of the previous year due to heavy production in Peru and Chile.

Most of the principal countries producing fish meal submit data to the International Association of Fish Meal Manufacturers monthly (see table).

* * * * *

PRODUCTION AND EXPORTS FOR SELECTED COUNTRIES, 1965 AND JANUARY 1966:

Member countries of the Fish Meal Exporters' Organization (FEO) account for about 90 percent of world exports of fish meal. The FEO countries are Chile, Angola, Iceland, Norway, Peru, and South Africa/South-West Africa.

Table 1 - Production and Exports of Fish Meal by Member Countries of the FEO, January-December 1965				
Country	1965		1964	
	Production	Exports	Production	Exports
.....(1,000 Metric Tons).....				
Angola	47.7	49.2	59.7	56.8
Chile	70.3	63.7	144.4	138.8
Iceland	172.1	146.2	125.4	124.3
Norway	309.2	268.2	185.9	179.4
Peru	1,282.0	1,260.0	1,552.2	1,416.5
South Africa (including S.-W. Africa)	272.0	224.9	257.4	226.5
Total	2,153.3	2,012.2	2,325.0	2,142.3

Table 2 - Production and Exports of Fish Meal by Member Countries of the FEO, January 1966				
Country	Jan. 1966		Jan. 1965	
	Production	Exports	Production	Exports
.....(1,000 Metric Tons).....				
Angola	1/	1/	6.9	7.4
Chile	33.7	6.7	12.8	9.0
Iceland	5.5	13.9	4.2	9.6
Norway	3.4	22.7	5.9	13.2
Peru	242.4	144.8	194.1	164.9
South Africa (including S.-W. Africa)	4.2	6.7	8.7	11.3
Total	289.2	194.8	232.6	215.4

1/Angola data not available for January 1966.

FOOD AND AGRICULTURE ORGANIZATION

WORLD TRADE IN FISHERY PRODUCTS, 1964:

Europe Leads World: Europe, excluding the Soviet Union, exported and imported more fish and fish products than any other conti-

International (Contd.):

nent in 1964, according to figures released January 27, 1966, in the Bulletin of Fishery Statistics (No. 8) of the Food and Agriculture Organization (FAO).

Table 1 - European Exports of Fishery Products by Leading Countries, 1964		
Country	Quantity	Value
	1,000 Metric Tons	Million US\$
Norway	462	156
Denmark and Faroe Islands	388	118
Iceland	402	101
Netherlands	206	57
Portugal	106	49
Spain	77	35
Federal Republic of Germany	81	31
Sweden	242	26
United Kingdom	53	26
France	36	17
Yugoslavia	24	12
Poland	14	6
Ireland	10	6
Italy	2	2.5
Hungary	3	1.5
Greece	3	1.3

Note: No other European nation exported as much as \$1 million worth of fishery products.

Total European fish imports amounted to 3,784,000 tons worth US\$1,047 million; exports were 2,124,000 tons worth \$656 million. This was substantially more than Europe's international trade in fishery products in 1963. Europe that year imported 3,456,000 tons worth \$887 million and exported 1,987,000 tons worth \$584 million.

The total European 1964 fish catch was 9.66 million metric tons out of a record world total of 51.6 million tons.

Table 2 - European Imports of Fishery Products by Leading Countries, 1964		
Country	Quantity	Value
	1,000 Metric Tons	Million US\$
United Kingdom	710	275
Federal Republic of Germany	795	158
France	321	123
Italy	258	93
Netherlands	299	61
Belgium and Luxembourg	189	53
Sweden	139	49
Denmark and Faroe Islands	212	33
Switzerland	62	26
Norway	95	21
Austria	59	17
Spain	69	16
Poland	82	15
Yugoslavia	54	12
Greece	32	11
Portugal	35	11
Finland	38	10
Hungary	37	7
Ireland	15	5

Note: No other European nation imported as much as \$1 million worth of fishery products.

North America Imports Record Amounts:

The countries and territories of North America imported 1,131,000 tons of fish and fishery products worth US\$542 million, and exported 547,000 tons worth \$322 million in 1964. North America includes Central America, Greenland and the Caribbean Islands, as well as Canada, Mexico, and the United States of America.

In 1963, North America imported 1,048,000 tons of fishery products worth \$493 million; exported 537,000 tons worth \$292 million.

Top exporting nation among the North American group in 1964 was Canada, selling abroad 351,000 tons worth \$184 million. Canada ranked second in the world in fishery export earnings in 1964, behind Japan, which exported 573,000 tons worth \$248 million. Canada also imported 28,500 tons worth \$20.5 million.

Top importing nation in 1964 in North America and in the world was the United States, buying 975,000 tons worth \$488 million.

The U. S. ranked second in North America and ninth in the world in export earnings, selling abroad 115,200 tons worth \$56 million.

Mexico exported 41,000 tons, mostly high-quality shrimp sold to the U. S. for a total of \$51 million. Mexico ranked third in North America and 10th in the world in fishery export earnings. Mexico also imported 35,600 tons worth \$5.7 million.

Barbados exported 800 tons worth \$1.6 million and imported 1,700 tons worth \$900,000. Costa Rica exported 1,200 tons (\$1.4 million) and imported 1,300 tons (\$615,000). El Salvador exported 4,300 tons (\$4.3 million) and imported 1,800 tons (\$706,000). Greenland exported 12,700 tons (\$7.2 million) and imported 200 tons (\$99,000). Honduras exported 300 tons (\$302,000) and imported 500 tons (\$195,000).

Nicaragua exported 1,900 tons worth \$1.7 million, imported 600 tons worth \$309,000. Panama exported 7,700 tons (\$7.6 million) and imported 2,500 tons worth \$1.2 million.

St. Pierre and Miquelon exported 3,100 tons worth \$1.3 million and imported 300 tons worth \$97,000. Trinidad and Tobago exported 100 tons (\$143,000) and imported 5,300 tons (\$2.3 million).

International (Contd.):

Complete international fish-trade figures for Cuba and the other countries and territories of the region were not available.

Asian Fish Imports and Exports Rise: In 1964, the nations of Asia, excluding Mainland China, Indonesia, and a few others, exported 806,000 metric tons of fish and fish products worth US\$344 million and imported 560,000 tons worth \$193 million. In 1963, Asia exported 755,000 tons worth \$317 million and imported 479,000 tons worth \$160 million.

In 1964, the biggest fish-exporting nation in Asia and in the world was Japan, selling abroad 573,000 tons worth \$248 million. The Japanese were also Asia's biggest fishery importer, buying 187 million tons worth \$70 million.

Japan has for many years been the world's leader in fishery exports. Until three years ago, it was the leading fish catcher, but now ranks number two behind Peru.

Besides Indonesia and Mainland China, international trade figures in Asia were unavailable for Brunei, Iraq, Laos, Lebanon, North Korea, North Vietnam, Macao, and Singapore.

International fish trade figures for the rest of Asia were reported as follows:

Burma exported \$6,000 worth of fish (quantity unavailable) and imported 5,200 tons worth \$2.5 million.

Cambodia exported 1,000 tons worth \$165,000 and imported 100 tons worth \$39,000.

Ceylon exported 200 tons worth \$191,000 and imported 42,700 tons worth \$14.4 million.

China (Taiwan) exported 1,800 tons worth \$1.2 million and imported 2,000 tons worth \$1.1 million.

Cyprus had no exports but imported 2,100 tons worth \$994,000.

Hong Kong exported 13,100 tons worth \$12.3 million and imported 68,700 tons worth \$32 million.

India exported 20,600 tons worth \$14 million and imported 18,900 tons worth \$8.1 million.

Iran exported 4,600 tons worth \$4.1 million. Import figures for Iran were not available.

Israel exported \$2,000 worth of fish (quantity unavailable) and imported 19,300 tons worth \$4 million.

Jordan had no exports but imported 1,700 tons worth \$822,000.

The Republic of Korea exported 42,600 tons worth \$15 million. Korea had no fishery imports.

Malaysia, excluding Sarawak, for which figures were not available, exported 51,500 tons worth \$9.7 million and imported about 44,000 tons worth \$11 million.

Pakistan exported 43,800 tons worth \$21 million and imported 700 tons worth \$205,000.

The Ryukyu Islands exported 6,400 tons worth \$2 million and imported 11,500 tons worth \$4.4 million.

South Arabia exported 4,300 tons worth \$697,000. South Arabian import figures were not available.

Syria exported 800 tons worth \$232,000 and imported 3,700 tons worth \$1.2 million.

Thailand exported 8,400 tons worth \$4.1 million and imported 3,000 tons worth \$1.6 million.

Turkey exported 9,500 tons worth \$3.4 million and imported 200 tons worth \$74,000.

The Republic of South Vietnam exported 1,000 tons worth \$632,000. Import figures for South Vietnam were not available.

Africa Increases Fish Exports: In 1964, the countries and territories of Africa exported 618,000 metric tons of fish and fishery products worth US\$140 million and imported 209,000 tons worth \$94 million.

In 1963, Africa exported 514,000 tons worth \$118 million, and imported 214,000 tons worth \$91.5 million.

The biggest fish-exporting areas were South Africa and South-West Africa, with exports of 401,000 tons worth \$74 million in 1964. They also imported 5,200 tons worth \$4.2 million.

International (Contd.):

The next biggest exporting nation was Morocco, selling abroad 87,100 tons worth \$33.5 million, and importing 100 tons worth \$164,000.

The biggest fish importers were the Congo (Leopoldville) and Nigeria. The Congo imported 25,400 tons worth \$21 million, and Nigeria imported 41,300 tons worth \$19.3 million. The Congo exported \$4,000 worth of fish. Nigeria exported 100 tons worth \$23,000.

International fish-trade figures for other African countries were reported as follows:

Angola exported 77,000 tons worth \$10.6 million, imported 3,600 tons worth \$2.5 million. Cameroon had insignificant exports, but imported 3,300 tons worth \$2.7 million.

The Central African Republic had no exports, but imported 500 tons worth \$397,000. Chad exported 300 tons worth \$127,000 and imported 100 tons worth \$150,000. The Congo (Brazzaville) had no exports, but imported 6,300 tons worth \$2.6 million.

Dahomey exported 100 tons worth \$58,000 and imported 1,100 tons worth \$333,000. Gabon had no exports but imported 2,100 tons worth \$1 million. Gambia exported 800 tons worth \$104,000, and imported 100 tons worth \$34,000.

Kenya exported 200 tons worth \$182,000 and imported 1,800 tons worth \$717,000. Libya had insignificant exports, but imported 1,400 tons worth \$733,000.

Madagascar exported 800 tons worth \$439,000, and imported 300 tons worth \$199,000. Mali exported 2,800 tons worth \$1.2 million and imported \$31,000 worth. Mauritania exported 8,400 tons worth \$1.4 million; data on imports were not available.

Mauritius had negligible exports, but imported 3,100 tons worth \$1.3 million. Niger exported 500 tons worth \$116,000, imported \$101,000 worth.

Southern Rhodesia exported 200 tons worth \$146,000, and imported 12,000 tons worth \$3 million.

Senegal exported 6,400 tons worth \$5.2 million and imported 600 tons worth \$845,000. Sierra Leone had negligible exports, but im-

ported 6,900 tons worth \$1.4 million. Somalia exported 1,300 tons worth \$467,000 and had no imports.

Sudan exported 600 tons worth \$143,000, imported \$2,000 worth of fish. Tanzania exported 2,000 tons worth \$481,000, and imported 1,600 tons worth \$548,000.

Togo reported exports worth \$8,000 and imports of 4,800 tons worth \$1.1 million. Tunisia exported 3,600 tons worth \$2.4 million and imported 200 tons worth \$108,000. Uganda exported 300 tons worth \$163,000, and imported 100 tons worth \$96,000.

The United Arab Republic exported 2,200 tons worth \$1.8 million and imported 6,200 tons worth \$2.2 million. Zambia exported 2,800 tons worth \$498,000 and imported 5,500 tons worth \$1.2 million.

Figures for 1964 for other African countries and territories were not available.

South American Trade: The nations and territories of South America conducted international trade in fish and fish products totaling 1,777,000 metric tons worth US\$208 million in 1964, according to the Food and Agriculture Organization of the United Nations.

South America's fishery imports were 72,000 tons worth \$27 million. In 1963, the continent's international fish exports amounted to 1,351,000 tons worth \$154.5 million; imports were 67,000 tons worth \$26.5 million.

The bulk of South America's international fish trade was Peru's 1,574,700 tons of exports, and the great majority of that was fish meal and oil for feeding animals, worth \$167 million. Peru ranked third in the world, behind Japan and Canada, in fishery export earnings; it also imported 800 tons of fish worth \$573,000.

Next in the South American group came Chile, with exports of 168,000 tons worth \$22 million. Chile imported \$62,000 worth of fishery products. Complete 1964 figures for Bolivia, Paraguay, and Venezuela were not available.

International fish trade figures for the other South American countries were:

Argentina--exported 3,400 tons worth \$570,000 and imported 4,600 tons worth \$1.4 million.

International (Contd.):

Brazil--exported 1,800 tons worth \$2.8 million, imported 26,300 tons worth \$14.6 million.

British Guiana--exported 3,100 tons worth \$4.1 million, and imported 3,200 tons worth \$1.5 million.

Colombia--exported 600 tons worth \$1 million and imported 10,600 tons worth \$1.8 million.

Ecuador--exported 8,100 tons worth \$3.5 million and imported 200 tons worth \$94,000.

French Guiana--exported 100 tons worth \$89,000 and imported 200 tons worth \$176,000.

Surinam--exported 800 tons worth \$886,000 and imported 1,500 tons worth \$700,000.

Uruguay--exported 800 tons worth \$114,000 and imported 900 tons worth \$533,000. (FAO, Bulletin of Fishery Statistics, No. 8, Fishery Commodities, 1964.)

FRESH-WATER FISH

IBP TECHNICAL MEETING ON THE BIOLOGICAL BASIS OF FRESH-WATER FISH PRODUCTION:

A technical meeting on the biological basis of fresh-water fish production will be held September 1-6, 1966, at the University of Reading, Reading, England, under the sponsorship of the International Biological Programme (IBP).

The purpose of the meeting will be: (1) to review the present state of knowledge about the biological production of fish in inland waters, and to present and discuss leading ideas concerning factors influencing fish production and the flow of energy through fish in fresh-water ecosystems, (2) to identify and highlight aspects in which progress is lagging and generally to act as a starting point for IBP projects in the field of fresh-water fish production, and (3) to act as a background against which an IBP Handbook of methods for research into fresh-water fish production can be drafted.

The program of the meeting will consist of about 20 invited papers, each of which will review the present status of a limited field

from the viewpoint of production research. The authors will be chosen internationally and asked to illustrate significant points in their subject by examples drawn from their own original contributions. Considerable time will be allowed for the discussion of each paper or group of papers. There will also be discussion on methods suitable for IBP projects.

The main areas to be covered by the tentative list of papers are: (1) vital statistics of fish populations, (2) relation of fish populations to the food supply, (3) behavioral factors influencing production, (4) predation and exploitation by man, and (5) the contribution of fresh-water fish production to human nutrition and well-being.

The authors of papers and the participants in a working-party to draft an IBP Handbook will receive special invitations. All others who are interested in the meeting are invited to attend as observers, especially those who expect to participate in IBP fish research.

Additional information may be obtained from either: Dr. Shelby Gerking, Department of Zoology, Indiana University, Bloomington, Indiana 47405, or Mr. E. D. Le Cren, Fresh-water Biological Association, The River Laboratory, East Stoke, Wareham, Dorset, England.

HERRING

HERRING RESEARCH IN NORWEGIAN SEA:

Soviet Union, Norway, and Iceland have concluded an agreement for joint herring research in the Norwegian Sea during 1966. The Soviet institute participating is the Polar Institute of Fisheries and Oceanography (PINRO) of Murmansk.

GENERAL AGREEMENT ON TARIFFS AND TRADE

TWENTY-THIRD SESSION HELD IN GENEVA:

The 23rd Session of the Contracting Parties to the General Agreement on Tariffs and Trade (GATT) was held in Geneva, Switzerland, March 24-April 6, 1966.

The GATT is the principal international forum where the world's trading nations deal with trade policy problems. Its members carry on over 80 percent of world trade. It is a multilateral trade agreement which re-

International (Contd.):

placed the pre-World War II bilateral trading system. The Kennedy Round of negotiations for lowering trade barriers is also taking place within the GATT framework.

A number of agenda items for the 23rd session dealt with the continuing efforts in the GATT to reduce and remove import restrictions. These efforts have enjoyed considerable success in recent years, and the reduction of the remaining restrictions continues to be an important aspect of U. S. commercial policy.

The agenda also called for regional arrangements to receive intensive attention at the session. These include the recently announced plans for free trade areas between Australia and New Zealand and between the United Kingdom and Ireland, as well as a number of older economic integration bodies, including the European Economic Community, the European Free Trade Area, the Central American Common Market, the Latin American Free Trade Area, and the Central African Economic and Customs Union.

In recent years, the Contracting Parties to GATT have turned increasingly to trading problems of particular interest to the less-developed countries. On February 8, 1965, they signed a new part (PART IV) of the General Agreement designed to provide an institutional and legal framework for dealing with these problems. In a parallel step, GATT established a new Committee on Trade and Development (CTD) to watch over implementation of the new provisions. The Committee's first year in operation was to be reviewed during the 23rd Session, and the work of the CTD during the coming year mapped out by the Contracting Parties.

Sixty-seven countries are now full Contracting Parties to the General Agreement. In addition, a number of other countries maintain varying degrees of association with the GATT, and several others have indicated their intentions to seek full membership during the coming year. (U. S. Department of State, March 21, 1966.)

INTER-AMERICAN TROPICAL TUNA COMMISSION

ANNUAL MEETING HELD IN GUAYAQUIL, ECUADOR:

Delegations from the five member countries of the Inter-American Tropical Tuna

Commission (IATTC): Costa Rica, Ecuador, Mexico, Panama, and the United States; and observers from Canada, Chile, Guatemala, Japan, Peru, and the Fisheries Department of the Food and Agriculture Organization of the United Nations, met in Guayaquil, Ecuador, April 19-20, 1966. The purpose was to review the status of the stocks of tuna in the eastern tropical Pacific, and to recommend fishing regulations, if necessary, to interested governments.



Annual Meeting of the IATTC, Guayaquil, Ecuador. Left to right: Senor Antonio Landa, Scientist on IATTC staff; Mr. Harold Loesch, Scientist on staff of Instituto de Pesca, Guayaquil; Dr. J. L. Kask, Director of Investigations, IATTC; Dr. W. E. Ricker, Canada, Observer; Senor Luis Pareja Pera, Director General of Fisheries, Ecuador; Senor Jose L. Cardona-Cooper, Chairman of IATTC; Dr. J. L. McHugh, U. S. Commissioner; Capt. Hector A. Chiriboga, Ecuador, Commissioner and Co-Director, Instituto de Pesca; Mr. Roy I. Jackson, Director, Dept. of Fisheries, FAO; Mr. Francois Bourgois, Director, Instituto de Pesca, Guayaquil; Senor Antonio Vaca Ruilova, Legal Adviser, Ministry of Industries and Commerce, Ecuador.

Members of the United States Delegation were Commissioners J. L. McHugh of Washington, D. C. (U. S. Department of the Interior), and John G. Driscoll, Jr., of San Diego, Calif. Advisers were W. M. Terry and D. R. Johnson of the Bureau of Commercial Fisheries, U. S. Department of the Interior; William C. Herrington, B. H. Brittin, and Richard Croker of the U. S. Department of State; and C. R. Carry and C. D. Day representing the tuna industry.

The scientific staff of the Commission, led by Dr. J. L. Kask, Director of Investigations, reported that the unregulated fishery in 1965 again overfished the yellowfin tuna resource slightly so that the present level of sustainable yield is about 85,000 short tons. The most recent estimate of the maximum sustainable yield of yellowfin is about 91,100 short tons. No estimate of the maximum sustainable yield of skipjack in the convention area has yet been possible. However, there is reason to believe that skipjack could sustain a substantially larger harvest.

To restore the yellowfin tuna resource to maximum productivity, it was necessary for the Commission to recommend a quota lower than 85,000 tons. It was agreed unanimously

International (Contd.):

to propose a quota of 79,300 tons for the 1966 yellowfin tuna fishery. This would restore the stock to maximum productivity in about three years. The best estimate of the scientists was that at the present rate of catching, this quota will be reached about the end of November 1966. When it becomes evident later in the year that the quota will be reached on or about a certain date, tuna fishing vessels will be permitted to fish only for skipjack and other tunas, and further fishing for yellowfin will be prohibited. Since it is impossible to catch skipjack without making some incidental catch of yellowfin, the yellowfin fishery will be stopped before the full quota of 79,300 tons is reached. The exact amount will depend on the length of time remaining in the fishing season. Thereafter, catches of tuna will not be allowed to contain more than 15 percent of yellowfin until the 1967 fishery opens on January 1.

Before the United States Government can impose such regulations on its own fishermen, a notice of proposed rule-making would appear in the Federal Register as a prelude to public hearings.

The staff of IATTC, in cooperation with other institutions and governments, has found that tuna in the eastern tropical Pacific are sensitive to changes in ocean currents and other variables in their environment. The circulation of the ocean, in turn, is affected by changes in atmospheric pressure and the force and direction of winds. Recent studies have shown that atmospheric conditions over one part of the world may affect oceanic circulation thousands of miles away. For example, the permanent zone of high atmospheric pressure in the vicinity of the Azores in the eastern Atlantic has an important effect on ocean conditions and tuna distribution and abundance in the eastern tropical Pacific. This emphasizes the importance of global studies of the atmosphere and the ocean if we are to understand how to harvest marine fishery resources more efficiently.

LAW OF THE SEA

CONVENTION ON FISHING AND CONSERVATION OF THE LIVING RESOURCES OF THE HIGH SEAS ENTERS INTO FORCE:

The Geneva Convention on Fishing and Conservation of the Living Resources of the High Seas entered into force March 20, 1966,

after the Netherlands became the 22nd country to ratify on February 18, 1966. The Convention is one of the four adopted at Geneva April 29, 1958, by the United Nations Conference on the Law of the Sea. The other three Conventions (the Territorial Sea and the Contiguous Zone, the High Seas, and the Continental Shelf) have entered into force.

Note: See Commercial Fisheries Review, December 1965 p. 48.

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CONFERENCE HELD AT UNIVERSITY OF RHODE ISLAND:

The first annual summer conference of the Law of the Sea Institute at the University of Rhode Island was held June 27 through July 1, 1966, at Kingston, R. I., with the help of a \$12,600 grant from the Office of Naval Research.

"The Federal Government's willingness to support this effort is just one indication of the growing concern, in both public and private circles, about serious national and international problems, dealing with the exploitation of the sea," the chairman of the University's Geography Department announced.

Progress in solving some of these problems was made at international conferences in Geneva, Switzerland, in 1958 and 1960, he said, but "there remain many areas in which continuing research and discussion are imperative. This is particularly true with respect to scientific studies pertaining to marine resource use."

The function of the Kingston conferences will be not only to clarify existing laws, but also to point up impending problems for which legal and scientific groundwork must be developed in advance.

"For instance," the chairman said, "we appear to have at least the basic scientific and technological knowledge needed to mine the sea floors, undertake shellfish farming, or similar projects, yet commercial activity is often discouraged because of the lack of clear-cut laws which give some protection for the heavy investments required."

The program was expected to draw about 150 persons for in-depth discussions of "Offshore Boundaries and Zones." Themes for conferences in 1967 and 1968 are "Extra-territorial Fishing Rights" and "The Exploitation of Minerals On and Beneath the Sea Floor."

International (Contd.):

The conference convened with a series of speeches and invited papers on the topic: "The Present Status of the Law of the Sea." On succeeding days the general topics were: "The Use of Offshore Waters," "The Continental Shelf," and "Special Problems of Offshore Control." A panel was held to discuss the Geneva conventions and the need for future modifications.

The Law of the Sea Institute, which is believed to be the first of its kind in the nation, was founded at the University of Rhode Island about a year ago to provide a forum for the exchange of ideas and information on the law of the sea. (Press release of University of Rhode Island, Kingston, R. I., March 27, 1966.)

NORTH SEA CONTINENTAL SHELF

AGREEMENT BETWEEN BRITAIN AND DENMARK:

A North Sea Continental Shelf Agreement between Britain and Denmark was signed in London, March 3, 1966, by officials of the two countries. The agreement is reported to follow the median line principal, i.e., a dividing line equidistant at all points from each country's territorial waters. The primary reason for negotiation of agreements in the North Sea is the valuable natural gas deposits believed to be in that area.

NORTHWEST PACIFIC FISHERIES COMMISSION

REPORT ON TENTH MEETING BETWEEN JAPAN AND U.S.S.R.:

Scientific Committee: The Scientific Committee of the International Northwest Pacific Fisheries Commission (Japan-Soviet) began its meetings in Moscow on March 4, 1966, and completed discussions on March 18. After devoting 18 sessions to consideration of the herring, crab, and salmon resources, the Committee presented its report to the Commission. The report was used by the Commission as a basis for setting catch quotas for crabs and salmon for the 1966 season. In brief, the Committee reached the following agreements on the condition of the stocks of fish under regulation by the Commission:

1. Herring stocks in the Sakhalin-Hokkaido areas continue in a state of decline. The Committee recommended that scientific investigations and research be continued on natural environmental factors and their effect

on the survival of the stocks, and that study be made of measures necessary for the restoration of the resource.

2. King crab stocks in the West Kamchatka area are showing evidence of decline and every precaution should be taken for their protection and conservation.

3. The level of the chum salmon run in 1966 will be close to that of 1965.

4. The size of the run of Asian red salmon in 1966 will be on the average level of the 1964 and 1965 runs.

5. King and silver salmon stocks in 1966 will be close to the average of recent years.

6. With reference to assessment of the total stocks of Asian salmon in 1966, the Committee concluded that the run will be equal to or somewhat lower than the level of the run in 1964.

Subjects Discussed: Japanese delegates agreed informally at the Japan-Soviet fisheries talks (which lasted almost six weeks) to the presence of Soviet officials at Japan's fishing bases in Hokkaido to inspect the counting of fish catches. The Moscow talks had been under way since March 1. This was the tenth meeting of the Commission under the Northwest Pacific Fisheries Convention which is due to expire in 1967. It is expected that the Treaty will be renegotiated.

Japanese and Soviet negotiators discussed at an informal session the Soviet-proposed creation of a new marine preserve in Zone A (north of the 45th parallel), curtailment of the fishing period in Zone B (south of the 45th parallel), and the problem of crab catch quotas.

According to Japanese delegation sources, the Soviets insisted last year's crab catch quotas for Japan--240,000 cases-- be cut in accordance with crab resources on the basis of a conclusion made earlier at a science subcommittee.

The Japanese side, on the other hand, called for the same number of cases as last year's level, saying the subcommittee's conclusion had no binding power on Japan for its reduction in crab catches. On the crab fishing zone, the Russians proposed to make the crab-rich area north of the 57th parallel an exclusive one for Russian fishermen, and to

International (Contd.):

eliminate the hitherto existing preserve south of the 53rd parallel to make it an exclusive fishing ground for Japan. The Japanese negotiators rejected this. They believed such a plan would put Japan at a disadvantage as compared with the Soviet Union. (The area north of the 57th parallel has heretofore been designated as a joint fishing ground for the two countries.)

Japan also rejected a Soviet plan calling for a reduction in Japanese crab catches from the present 6:4 ratio for the Soviet Union and Japan to 7:3 in the area between 56 degrees 20 minutes N. latitude and 53 degrees N. latitude.

Japan, however, agreed on a Soviet investigation into Japanese fishing operations in the northwestern Pacific after the close of the crab fishing period (April-August in past years) since the Russians alleged that Japanese trawlers and drag-netters caught a considerable quantity of crabs after crab fishing boats had completed operations and left the area.

The Soviet side at the Moscow talks proposed a reduction in the number of fishing vessels in Zone B (south of the 45th parallel), shortening of the fishing period by one month (now 87 days) in Zone A (north of the same parallel), and the creation of a new marine preserve.

Japanese fishermen engaged in salmon fishing in the northwestern Pacific made a strong plea to the Government to reject Soviet overtures at the Japan-Soviet fisheries talks. The representation was made to the Japanese Agriculture-Forestry Minister by scores of representatives of seven fisheries organizations composed of fishermen engaged in salmon fishing in the northern Pacific. The fishermen said they conducted fishing operations for a total of 100 days a year in Zones A and B--40 days in Zone A (north of the 45th parallel) and 60 days in Zone B (south of the same parallel). They expressed fear that if Japan accepted the Soviet proposal, their fishing periods would be cut to only one month, causing small-size fishing interests to go bankrupt.

Salmon and Crab Catch Quotas in Northwest Pacific: Japan and the Soviet Union completed their talks on April 14, 1966. The major outcome of the meetings was the 1966 salmon and crab catch quotas in the fishing areas under the jurisdiction of the International Northwest Pacific Fisheries Commission.

The salmon quota allotted to Japan is 96,000 metric tons; and that for the Soviet Union is



Pulling in a gill net and removing salmon from the net aboard a Japanese fishing vessel in the Northwest Pacific.

50,000 tons fished in Soviet territorial waters. (The 1965 quotas were 115,000 and 65,000 tons, respectively. In 1964, the quotas were 110,000 tons for Japan and 65,000 tons for the Soviet Union.) The 1966 king crab quotas agreed upon are 240,000 cases (48 $\frac{1}{2}$ -lb. cans) for Japan and 420,000 cases for the U.S.S.R. (In 1965, the quotas for both countries were the same. In 1964, Japan had a quota of 252,000 cases and the Soviet Union had a quota of 378,000 cases.) (Editor's Note: The Soviet pack of canned crab meat is put up in cases of 96 cans each. Hence, in some reports the Soviet quota is given as half the number of cases reported here.)

The 1966 Japanese salmon quota will permit a catch of 48,000 tons in Area A (north of 45° N. latitude) and 48,000 tons in Area B (south of 45° N. latitude).

In Area A the salmon fishing season for the Japanese mothership fleet is May 15-July 15 with a closed season July 1-July 14 in the area between 160° E. and 165° E. longitude and 48° N. and 52° N. latitude. For the land-based gill-net fleet, the season in Area A is June 21-July 25 with a closed season July 1-14 in the area between 160° E. and 165° E. longitude and 46° N. and 48° N. latitude.

In Area B, Japan's catch quota is 48,000 metric tons with a 10-percent tolerance above

International (Contd.):

the quota. The fishing season for Area B is April 30-July 30 with no prescribed closed period. The Japanese quotas represent a decrease from 1965 of 8,000 tons in Area A and 11,000 tons in Area B. In 1964, the Japanese quota in each area was 55,000 tons. The Japanese expect to license for salmon fishing 11 motherships with 369 catcher boats for Area A. This is the same number of vessels which fished in that area in both 1965 and 1964.

Japan will operate 4 motherships in the king crab fishery, the same as in 1965. The U.S.S.R. plans to operate 7 motherships for king crab, 1 less than in 1965.

Japanese Reaction to Negotiations: As in past years, there were some differences of opinion in Japanese fishing industry circles as to the outcome of the negotiations. The larger enterprises, as represented by the Greater Japan Fisheries Association, were reported to be satisfied in general with the results. This group felt that the salmon fishing regulations and quotas were the most difficult issues in the negotiations. Since the number of motherships and catcher boats which would be allowed to fish in Area A were not reduced, this group was reported to be pleased with the outcome. On the other hand, the National Federation of Salmon and Salmon-Trout Drift-Net Fishing Industry Associations, which consist of medium and small fishery enterprises, expressed strong dissatisfaction with the establishment of new restrictive waters north of 46° N. latitude, although it was instituted for 1966 only. The 332 drift-net fishing vessels (the land-based fleet) which operate in Area B (south of 45° N. latitude), usually move north beginning about June 21 and fish between 45° and 48° N. latitude. The closed season in that area, between July 1 and 14, will result in stopping these fishing operations. According to the land-based group, that area is on the route of the fish migrating to West Kamchatka and it is a good fishing ground where, at times, as many as half of the drift-net vessels congregate. (Fisheries Attache, United States Embassy, Tokyo, March 24 and April 14, 1966 and various press sources.)

Note: See *Commercial Fisheries Review*, July 1965 p. 73, June 1965 p. 43, October 1964 p. 68, July 1964 p. 42.

ORGANIZATION FOR ECONOMIC COOPERATION
AND DEVELOPMENTFISHERIES COMMITTEE MEETING:

The Fisheries Committee of the Organization for Economic Cooperation and Development met in Paris, March 10-11, 1966. Papers were reviewed on (1) confrontation of national fishery policies, including drafts for France and the United Kingdom; (2) fisheries standards; and (3) the program of work for 1966-1967. The main work of the Fisheries Committee in 1966-1967 will be a confrontation of national fishery policies. This will include a review of the necessity for subsidies, tariffs, etc. Objective is to aid free movement of fishery products in foreign trade.

SALMON

UNITED STATES-CANADIAN
PACIFIC SALMON CONFERENCE:

United States and Canadian fishery officials and industry representatives met in Ottawa, April 4-6, 1966, to give consideration to salmon fishing problems of common concern in the Pacific Northwest, British Columbia, and Southeastern Alaska. Technical consultants from the International Pacific Salmon Fisheries Commission were also present. A preliminary meeting to exchange views on these problems was held in Washington, D. C., October 12-14, 1965.

Serious consideration was given to problems arising from the intermingling in the United States and Canadian salmon fisheries in northern British Columbia and Southeastern Alaska of salmon bound for both Canadian and U. S. streams; and to the adequacy of the provisions of the 1956 Protocol to the 1930 Sockeye Salmon Convention which brought pink salmon in the Convention Area within the responsibilities of the International Pacific Salmon Fisheries Commission. Proposals to solve the problems under consideration were presented by both the United States and Canadian Delegations but no agreement was reached.

The Canadian position was that one country should not intercept salmon bound for the other. On this ground, Canada proposed some adjustment in the areas in which salmon net fishing is allowed.

International (Contd.):

The United States delegation said that the Canadian position overlooked the historic fisheries of each country which for many years had fished mixed stocks of salmon.

The Canadian Deputy Minister of Fisheries said that the rationale in support of the Canadian position is that the brunt of the effort to maintain the salmon stocks by regulation, to protect the spawning rivers from damage by other uses, and for positive measures to increase the stocks falls on the country which has the rivers in which the salmon are bred. To make these efforts worthwhile to that country it must be able to harvest the salmon and reap the benefits.

In applying this principle to the problem of mutual concern in the British Columbia-Alaska boundary area, Canada proposed the inward adjustment of salmon net-fishing limits on both sides of the border as one means of minimizing interception of salmon. The United States Delegation was not prepared to consider such a proposal and thus the Canadian Delegation stated it would be necessary to review its position with regard to the location of the salmon net-fishing limits currently in force. The Canadian spokesman pointed out that Canada would not have agreed to the establishment of the present limits had it been known in 1957 that they were to be established in Alaska on a different basis from that in British Columbia and in the United States to the south. In 1959, and again in October 1965, Canada reserved the right to move these limits seaward.

The Canadian view was that to clarify the situation it would be necessary to declare that the limits as now defined no longer exist as an agreement between the two countries. Canada could not predict how long the limits might exist in their present form as a domestic regulation. Canada suggested that a meeting be held in the near future to negotiate seaward net-fishing limits anew.

Canada recognized that other measures may be worth considering such as fishing closures at times when fish bound for the other country are caught. If this objective could be entertained by the United States, Canada was prepared to cooperate in investigations to determine what action would be effective to minimize the interception of salmon bound for the other country.

The Canadians said that in the absence of satisfactory joint action to revise net fishing limits at a meeting in the near future, it would be necessary for Canada to take a complete new look at the restrictions applied to her own fisheries with a view to possibly extending them seaward. The Canadian primary objective, however, is to minimize catching by one country of salmon bound for the rivers of the other using as a tool inward revision of the net-fishing limits.

The Canadian position with regard to problems related to the adequacy of the Pink Salmon Protocol, originally stated in Washington, was that the same principle could be applied. The Canadian view was that Canada should be getting a larger proportion of the salmon bound for the Fraser River. It was realized that there has been cooperation between Canada and the United States to build up the runs to the Fraser River, but Canada claimed that the economic cost to Canada has been several times greater than the cost of the joint effort.

The United States suggestions for the removal from division of some catches within the present Convention Area, which would have the effect of increasing the catches of Fraser River pinks by the United States, and of inward movement of the salmon net-fishing limit across Juan de Fuca Strait, which would affect Canadian more than United States fisheries, were of interest and the Canadian Delegation stated a willingness to discuss proposals of this kind on a broader basis involving the entire question of the division of catches. Canada was prepared to consider doing away with commercial fishing all the way into the Strait, but would not entertain proposals on a piecemeal basis adverse to the Canadian interest. Such proposals would have to be considered on a much broader basis involving consideration of the changing of the provisions under the Convention to give Canada a higher proportion of the catch.

The Chairman of the United States Delegation, summarized the United States position on these questions. It was that each country should fish the stocks of salmon originating in the rivers of the two respective countries, taking into account the historic fisheries of each country. The United States Delegation pointed out that the Canadian position as stated had overlooked the historic fisheries that for many years fished mixed stocks of salmon. Salmon fisheries of the two countries in the Strait of Juan de Fuca, northern Puget Sound and the extensive offshore salmon troll fishery of Canada and the United States take mixed stocks of salmon bound for United States and Canadian streams. The Canadian Johnstone Strait salmon fishery has traditionally taken mixed stocks of salmon from rivers of Canada and the State of Washington. These and other fisheries such as the United States and Canadian fisheries of northern British Columbia and southern Southeastern Alaska all operate to a greater or lesser extent on mixed stocks of salmon. The United States could not agree to action that would cause economic hardship to or erosion of these long-standing fisheries in the absence of any demonstrable conservation need of the resource--especially when such action benefits only one party at the expense of the other.

The United States made several suggestions as to how to further eliminate areas of contention between the fisheries, including a suggestion to consider a broadened international convention which would cover certain salmon problems of common concern, since the mixing of the British Columbia and United States salmon stocks is so extensive and in many areas so complete.

The United States stands ready to participate fully in programs which would have as their objective the improvement of the salmon resources of common concern.

In Southeastern Alaska and Northern British Columbia, the fishery in the national waters of each country harvests variable amounts of salmon from the rivers of the other country which migrate through these waters. The amount of intermixing is highly variable although both countries have little scientific knowledge regarding the extent of the variation. To the extent that United States national fisheries affect the achievement of a successful conservation program for Canadian stocks, it is willing to regulate its fisheries to accommodate such a goal. But in the area in question, no such need has yet been demonstrated. If Canada believes that United States fisheries are adversely affecting the conservation of salmon resources of Canadian rivers, the United States would appreciate evidence of this.

International (Contd.):

The United States has little knowledge of the effects of Canadian and United States fisheries upon the conservation programs of the stocks of salmon of northern British Columbia and Southeastern Alaska and is prepared to cooperatively study this problem and clarify the issues as they apply to these programs.

With respect to the salmon resources in the southern area, the United States believes that both countries should act whenever possible to improve the conservation programs which involve the salmon fisheries of common concern. To do less is to be unresponsive to a recent request made by the International Pacific Salmon Commission to both Governments to improve the conservation of pink salmon. The United States considers that its proposals for better management of the salmon stocks in this area are sound and consistent with good salmon management.

The present salmon convention has been an effective instrument for rehabilitating depleted runs of salmon and maintaining these runs and it has allowed United States and Canadian fisheries to operate with a minimum of friction. Nevertheless, it is believed that some administrative adjustments can be made within the terms of the present Convention to improve the conservation and management of the fisheries.

The United States emphasized that it is prepared to further explore all aspects of the fishery problems of common concern to the two countries and to fully participate in studies to determine conservation needs. On the other hand, the United States is determined to protect the important historic fisheries which operate on mixed stocks of salmon. The United States does not believe the Canadian proposal provides a practical means for resolving the common conservation and economic problems of the two industries.

One important result of the meeting was to focus attention sharply on the issues of common concern and to provide clarification of the positions of the two countries.

The second result was agreement to recommend to the two Governments a meeting between representatives of the two countries in Seattle, Wash., beginning May 17, 1966, to give consideration to determining seaward net-fishing limits anew. (Canadian Department of Fisheries, Ottawa, April 7, 1966.)

FISHING VESSELS

WORLD CONSTRUCTION DATA:

In 1964, the world's shipyards built 578 fishing and fish-processing vessels of over 100 gross tons, with a total gross tonnage of about 463,000. This was 125 percent more than in 1963, when the construction of new fishing vessels amounted to 206,000 gross tons. Japan still occupies first place with a gross tonnage of 106,000, closely followed by Sweden with 97,000, Poland 60,000, West Germany 45,000, and Spain 31,000. The United States occupies 17th place with the construction of 2 fishing vessels totaling 1,040 gross

tons. (Budownictwo Okretowe, Vol. 10, No. 8, 1965.)

Editor's Note: Data for construction of fishing vessels in 1964 by the U.S.S.R. and East Germany are not included in these totals.

In 1964, the United States added 19 vessels over 100 gross tons to the fishing fleet. Of those, 12 (3,000 gross tons) were new construction.

Table 1 - World Construction of Fishing and Fish-Processing Vessels Over 100 Gross Tons, 1964

Country	Vessels		Increase in Gross Tonnage Over 1963
	Number	Gross Tonnage	
Japan	171	106,436	26,253
Sweden	9	96,633	96,073
Poland	21	59,613	19,146
German Federal Republic	15	44,576	34,123
Spain	91	30,748	7,620
Netherlands	56	26,001	16,069
Denmark	5	23,497	18,797
Norway	52	19,843	10,427
France	43	15,438	5,622
United Kingdom	17	11,312	6,934
Canada	22	8,407	3,214
Italy	12	7,730	3,893
Chile	30	3,131	1/
Belgium	7	2,323	1,890
Portugal	1	2,162	1,702
Peru	10	1,054	1/
United States	2	1,040	-114
Yugoslavia	4	640	510
Argentina	4	560	1/
Greece	1	505	217
Total	578	462,477	256,630

1/Not available.

Note: Data do not include Soviet and East German fishing vessel construction. The data for the United States are incorrect (see "Editor's Note").

Original Source: Lloyd's Register of Shipping.

Table 2 - World Construction of Fishing and Fish-Processing Vessels of Over 100 Gross Tons by Percentage of Various Types

Type of Fishing Vessel	1964	1963	1962	1961
	(Percent)			
Fishing Vessels:	51.0	88.2	71.1	61.7
conventional	34.4	70.6	1/	1/
factory trawlers	16.6	17.6	1/	1/
Fish-processing and transporting vessels	49.0	11.8	28.9	38.3
Total (Percent)	100.0	100.0	100.0	100.0
Total (in 1,000 gross tons)	463.0	206.0	1/	1/

1/Not available.

Note: Data for the Soviet Union and East Germany are not included.

Motherships, base ships, and fish carriers contributed almost one-half (49 percent) of the total new tonnage in 1964. Factory trawlers comprised about one-third of all operational fishing vessels built.



Aden

FISHERY TRENDS IN 1965 AND OUTLOOK FOR 1966:

The Department of Fisheries, Federation of South Arabia, is making plans to substantially increase the area's fish catch which totaled 54,000 metric tons in 1964 and about 51,000 tons in 1965. The Department of Fisheries sponsored the construction of the Federal Star II, a 40-foot purse-seine vessel launched in Aden in December 1965. Two similar vessels are under construction, and two others planned. The Federal Star II is already demonstrating new fishing methods to fishermen in the area.

The sale of outboard motors in South Arabia has skyrocketed, especially in the area around Mukalla. Fishermen are also building larger vessels under the guidance of the Fisheries Department.

A proposed 3-year United Nations Special Fund Project, involving the expenditure of US\$990,000 and 4 or 5 experts to survey the fish resources in the area, is again under active consideration after having been shelved for a year.

Plans to build a \$3 million fish meal plant in Mukalla to process up to 120,000 metric tons of sardines annually are being considered jointly by United States and British interests. (United States Consul, Aden, March 25, 1966.)

Note: See Commercial Fisheries Review, February 1966 p. 50.



Angola

GOVERNMENT REGULATIONS DISCOURAGE SOUTH AFRICAN FISHING FIRMS IN ANGOLA:

Of 4 South African fishing firms which entered the Angolan fishing industry in 1964 and 1965, only 1 is known definitely to be engaged actively in fishing in Angolan waters. This is attributed to the adoption by Portugal in November 1965 of legislation requiring the use of Angolan-owned fishing vessels and Portuguese majority control of local companies. One of the South African fishing companies involved announced to its stockholders that it had completely withdrawn from the Angolan fishing industry and would probably forfeit US\$70,000 paid as a first installment on its

purchase of a fish factory in the port of Mocamedes. The South African companies had been attracted to Angola by reportedly large resources of pilchards and the absence of quota or seasonal restrictions on catches. (United States Embassy, Pretoria, April 13 1966, and United States Consulate, Luanda, January 20, 1966.)

Note: See Commercial Fisheries Review, December 1965 p. 50, March 1964 p. 40.



Australia

TUNA SEASON SHORT IN NEW SOUTH WALES:

The 1965 tuna fishing season in New South Wales was one of the shortest on record. It opened in mid-November and was over by the end of December. With some returns still due, the catch on January 1, 1966, was 2,260 metric tons, about 300 tons less than in the previous season. By early January, most of the fleet had shifted to South Australia. (Australian Fisheries Newsletter, February 1966.)



Brazil

PACKING FIRM STARTS FISHING FLEET:

A food packing company based at Belem (northeast coast), Brazil, is purchasing three trawlers from Mazatlan, Mexico. These first three vessels mark the beginning of the company's fishing fleet. The firm intends to produce shrimp and spiny lobster products for foreign markets and salt fish (bacalao) and fish meal for the domestic market. (Ocean Fisheries, vol. 2, no. 1, January 1966.)



Canada

CATCH EXPANSION FORECAST AT ATLANTIC OFFSHORE FISHING VESSEL CONFERENCE:

The first Canadian Atlantic Offshore Fishing Vessel Conference was held February 7-9, 1966, in Montreal. The vigorous campaign Canada is undertaking to increase its fish catch on the East Coast was emphasized at the Conference. Approximately 300 participants, including naval architects, fishermen,

Canada (Contd.):

fishing vessel owners, and fishery administrators, as well as others allied with the fishing industry, attended. The Conference was sponsored by the Federal-Provincial Atlantic Fisheries Committee composed of the Governments of Quebec, Nova Scotia, New Brunswick, Newfoundland, Prince Edward Island, and Canada. The purpose was to stimulate development of vessel designs particularly suited to the specific requirements of Canada's Atlantic offshore fisheries through consideration and correlation of available data relating to the design of fishing vessels over 100 gross tons with a view to developing improved concepts. Thirty-three papers were presented. The General Chairman was the Federal Deputy Minister of Fisheries of Canada, and Session Chairmen were the Deputy Ministers of Fisheries from each Province.

In the opening address, the Federal Deputy Minister of Fisheries emphasized that in recent years there has been an expansion by Canadians in the long established East Coast fisheries for various species of groundfish, including cod, haddock, flounders, and ocean perch. Present catch is about one billion pounds annually. Based on the Canadian fishing industry's plans to increase its fishing power, an increase to two billion pounds or more in the next decade is expected.

The agenda of the Conference was composed of three main items, and a summary of the points stressed under each follows:

Provincial Government Plans: The Deputy Minister of Fisheries for each of the five Provinces reviewed the present offshore fishery and future plans for his province.

QUEBEC: During the next 3 years, the Province contemplates financing the construction of 19 vessels over 100 gross tons. They will range in size from 160 gross tons (90 feet) to 500 gross tons (155 feet). It is expected that by 1975, the main increase in catch will be made up of herring--from 40 million pounds in 1965 to 175 million pounds in 1975. Ocean perch catches should increase from the present 35 million pounds to 60 million pounds by 1975, and cod from 55 million to 78 million pounds.

NOVA SCOTIA: At the end of 1964, the deep-sea fishing fleet consisted of 120 vessels. By 1968, the fleet inventory and projected catch would be as follows:

Type of Vessel	Size	Number
	Feet	
Groundfish trawlers	Over 100	90
Herring vessels	Over 100	40
Whaling	Over 100	5
Groundfish druggers	84-100	16
Long-liners	84-100	20
Scallop druggers	Over 100	50
Total		221

Table 2 - Nova Scotia Catch 1964, and Forecast 1968

Item	1964	Forecast 1968	Percentage Change
	(Thousands of Pounds)		%
Groundfish	350,251	414,000	+ 18
Herring	98,545	500,000	+400
Whale meat	1,600	5,350	+235
Swordfish	11,856	10,000	- 16
Scallops	15,979	12,000	- 25

By 1975, it is estimated no change will occur from the 1968 figures for swordfish, scallops, and whale meat; but groundfish landings should be around 560 million pounds, up from the 1968 figure of 414 million pounds, with herring doubling that of 1968, reaching 1 billion pounds.

NEW BRUNSWICK: Offshore fishing operations in this Province are still comparatively small. Plans call for an increase in these operations, but not by the construction of large single units (130-150 feet) since nearly all offshore fishing vessels are under single ownership and operation. The New Brunswick Fisheries Department has, therefore, recommended to the Fisheries Loan Board of New Brunswick that the limit in the size of trawlers to be financed for fisheries be 100 feet. The trend in New Brunswick is toward the financing and construction of many West Coast-type combination vessels of both steel and wood.

PRINCE EDWARD ISLAND: Offshore fishing in this Province did not start until 1950, when a 59-foot dragger commenced otter trawling. Vessels now range to 128 feet. No projections were made for the future. One of the main problems is finding crews for large offshore vessels. Fishermen in Prince Edward Island are concentrated in the lobster fishery which can be worked on a daily basis.

NEWFOUNDLAND: It is projected that the number of offshore trawlers operating out of Newfoundland will increase from the present 47 to 179 by 1975. The majority will consist of stern trawlers, each of about 400 gross tons. Groundfish landings are projected at 1 billion pounds by 1975, compared with 210 million pounds now. It is anticipated that the herring fleet, which consists of only four vessels, will increase considerably. The present herring fishery is based on cooperative exploration and gear research efforts by the Federal and Provincial Fisheries Departments and private industry carried out in 1964.

During the discussion which followed the Provincial presentations, no exceptions were taken to projected expansions in large vessel construction and landings. It was brought out, however, that production goals would also depend on increases in efficiency through new methods of mechanization, automation, and preservation, as well as expanded programs of fishermen's training, gear research, and exploration.

Fishing Industry Viewpoint: This session included the presentation of papers by leading members of industry. One industry representative stressed the need for greater coordination between government and the fishing industry in the future development of fisheries. He indicated emphasis should be placed on the necessity for automating fishing vessels to enable smaller crews to attain higher earnings as well as to improve handling methods and working conditions. The need for further explorations along with simultaneous development of new harvesting techniques for harvest of unutilized species was also stressed.

Canada (Contd.):

Another manager of a processing firm pointed out the importance of the United States market. He said, "the outlook for fishery products in North America is very optimistic. The demand in the United States will increase 40,000,000 pounds annually from population expansion alone Our Canadian industry is trying to take advantage of this situation and our trawler fleets have seen considerable buildup in the past few years." He also mentioned that Canada's problems are not those of marketing, but of supply and rising operating costs.

A fishing vessel owner set forth his views in a paper entitled "A Skipper's Viewpoint on Offshore Fishing Vessels." He indicated that ships without efficient antirolling and pitching systems will be idle at the dock 5 years from now because they will be unable to get crews. Also, that the crews of the future will come from Canada's high schools and fisheries colleges, supplemented perhaps by immigrants. He said naval architects, shipbuilders, and vessel owners should now think in terms of building vessels on which men of the future will want to fish. Vessel operators will have to get used to providing accommodations equal to or better than in the homes of shore workers.

Vessel Design and Equipment Trends: Twenty-two papers on a variety of topics ranging from the design of various types of vessels through economic considerations and hydrodynamic characteristics of specific Canadian-designed stern trawlers were presented during session under this agenda item. Of particular interest were several papers on the various aspects of the design of a 149-foot stern-ramp trawler suitable for the Northwest Atlantic fishery from Canadian ports. The design was the result of a cooperative undertaking between the Federal Industrial Development Service, the fishing industry, and a private naval architect.

Automation of fishing vessels was discussed in several papers. Additional papers of interest were those on combination stern trawler-purse seiners, single-deck combination vessels, trawler development in Great Britain and Germany, and construction and design of fishing vessels in Great Britain and Canada, 1955-65.

The featured speaker emphasized the need for continued activity and improvement of all vessel designs. He also indicated the great need for operational records on the actual performance of fishing vessels as a basis for future development.

--E. A. Schaefer, Chief,
Branch of Exploratory Fishing,
Bureau of Commercial Fisheries,
U. S. Department of the Interior,
Washington, D. C.

* * * * *

PROCESSING COMPLEX ON GASPE PENINSULA PLANNED:

The small fishing community of Riviere-au-Renard on the Gaspé Peninsula is the site of a C\$3.5 million fish-processing plant being built with financial aid from the Quebec Provincial Government. Attraction of the location is a harbor that is practically ice-free year-round. The Quebec Provincial Government also proposes to finance the construc-

tion of an ice-making plant, cold-storage, and vessel facilities at Riviere-au-Renard.

Plans for the new facilities on the Gaspé Peninsula were announced February 23, 1966, during the dedication of a new cold-storage and fish-distribution center at Quebec. The announcement was made jointly by a representative of a large fisheries cooperative federation and the Quebec Provincial Minister of Industry and Commerce.

It was also announced that the fisheries cooperative had under construction a 157-foot trawler which is sufficiently large to operate all year. The federation was also building two smaller trawlers, 87 and 60 feet long, respectively. (United States Consul, Quebec, March 3, 1966.)

* * * * *

FISHERY LANDINGS, 1965:

Canadian total sea fisheries landings (including Newfoundland) during 1965 amounted



Fig. 1 - Off the British Columbia coast of Canada, a purse-seiner is drawing the net tighter around a good catch of herring.

Canadian Fisheries Catch and Value of Selected Species, 1964-1965				
Species	Landings		Value	
	1965	1964	1965	1964
	.. (1,000 Lbs.) ..		.. (1,000 C\$) ..	
<u>Atlantic Coast:</u>				
Cod	569,661	575,702	23,152	22,061
Haddock	92,721	106,313	6,041	6,224
Pollock	51,712	56,956	1,878	1,832
Flounder and sole	201,523	161,864	6,509	5,240
Herring	403,972	312,605	4,272	3,206
Swordfish	8,034	11,857	3,347	3,561
Lobsters	40,491	41,876	26,616	24,244
Scallops	19,710	16,684	10,847	7,276
<u>Pacific Coast:</u>				
Halibut	1/32,372	2/33,292	1/10,914	2/8,309
Herring	443,555	505,286	6,158	6,167
Salmon	86,099	124,220	24,962	30,244
1/Including 7,387,000 pounds (C\$2,482,000) landed in U. S.				
2/Including 8,168,000 pounds (C\$2,039,000) landed in U. S.				

Canada (Contd.):



Fig. 2 - The Acadia Albatross, a modern Canadian stern trawler. The vessel, all-welded steel strengthened for navigation in ice, is 152 feet long overall. Vessel is operated by a Nova Scotia fisheries firm.

to 2,295.6 million pounds (valued at C\$140.7 million) as compared with 2,238.8 million pounds (valued at C\$132.4 million) during 1964. (Monthly Review of Canadian Fisheries Statistics, December 1965.)

* * * * *

GOVERNMENT TO HELP FISHING INDUSTRY REPAIR NEWFOUNDLAND STORM DAMAGE:

The Canadian Federal and Newfoundland Governments have reached agreement on compensation to fishermen who suffered severe losses in the storms of January 19 and 28, 1966.

The damage reported from all sections of Newfoundland totaled C\$510,000 with a major concentration of loss in the Conception Bay-Southern Shore area, where losses reached approximately \$400,000. Losses covered a wide range of fishing vessels and equipment, although the heaviest losses involved destruction of fish-processing and other shore installations.

Compensation plans were announced by the Federal Fisheries Minister on April 7, 1966. The Canadian Federal Government will assume responsibility for assisting fishermen

in the restoration of landings and local processing facilities in settlements where these have been largely demolished. This will be done through an acceleration of the Federal Government's community program to provide suitable facilities in Newfoundland for the handling of either fresh or salted fish depending on the wishes of the fishermen concerned. It is estimated that the additional cost of such works may reach \$500,000 over the next year.

The Newfoundland Provincial Government will assume responsibility for compensation up to 60 percent of replacement value to individual fishermen in the major disaster areas for their losses of fishing vessels, engines, and cod traps.

In view of the time required to plan and design suitable community facilities, the Federal Fisheries Minister pointed out that in any community where damage was such that fishermen could not carry on the 1966 fishing operations, temporary facilities would be provided as quickly as possible. The minister also indicated that the Federal Department of Public Works would endeavor to restore public wharves and other facilities as quickly as possible and particularly in settlements where damage seriously interferes with the 1966 fishery. (Canadian Department of Fisheries, Ottawa, April 7, 1966.)

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QUEBEC'S MARITIME FISHERIES, 1965:

Total Quebec landings of fishery products in 1965 amounted to about 142.4 million pounds

Quebec's Maritime Fisheries Catch and Value of Selected Species, 1964-1965				
Species	1965		1964	
	1,000 Lbs.	C\$ 1,000	1,000 Lbs.	C\$ 1,000
Cod	51,265	2,019	53,536	1,887
Herring	46,065	270	40,957	290
Ocean perch	27,678	766	20,208	559
Salmon	571	361	448	259
Lobster	3,293	1,801	3,168	1,549
Halibut	449	95	428	106
Plaice	7,369	234	5,634	174
Mackerel	771	23	1,980	61
Haddock	427	21	622	30
Smelt	642	52	743	86

with a value of C\$6.3 million as compared with 131.2 million pounds, valued at C\$5.3 million in 1964-- an increase of 8.5 percent in quantity and 18.9 percent in value. (Quebec Bureau of Statistics.)

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Canada (Contd.):

PROGRAM TO IMPROVE FISH HANDLING AT SEA:

The Inspection Service of the Canadian Federal Department of Fisheries is placing emphasis on the proper handling of fish aboard fishing vessels as part of its program to bring about improved quality of fishery products. Increasing competition from other countries in traditionally Canadian markets for processed fish, together with rising living standards in the countries where those markets exist, has resulted in demands for higher-quality products.

Dockside inspection is now carried out on a voluntary basis in Canada. There have been suggestions from leaders in the fishing industry as well as from government officials that such inspection should be mandatory. This would ensure the maintenance of proper construction standards and cleanliness of fish-holding pens aboard vessels. It would also ensure that each vessel had sufficient ice aboard to chill the catch adequately.

In the meantime, the Canadian Inspection Service is cooperating with fishing skippers and crews in an educational program designed to demonstrate the best methods of handling fish at sea. (Trade News, Canadian Department of Fisheries, January 1966.)

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PUMPS TO UNLOAD SALMON DEVELOPED IN BRITISH COLUMBIA:

The following summary of British Columbia development work on fish pumps for larger size fish was published by the Canadian Department of Fisheries in Trade News, December 1965:

Four fish pumps have been developed in British Columbia. Experimental work began at the Vancouver laboratory of the Fisheries Research Board of Canada in 1961 on an unloading method based on the assumption that fish could be lifted from a pressure vessel by the impelling force exerted by circulating water. Compressed air was provided to replace the fish as they left the tank and to maintain the necessary static pressure.

The small laboratory apparatus designed for these tests operated very successfully and provided the engineering data for much larger equipment installed on a salmon packer later that year.

"Derek Todd" Pump: The significant findings from the laboratory experiments were that the fish delivery pipe should be a little larger than the depth of the largest fish and that the linear velocity of the transporting water should be about 4 feet per second. The prototype pump was installed on the salmon packer Derek Todd, and has been used during salmon seasons for the last 5 years. It is used to rapidly unload salmon from four cylindrical pressure tanks permanently installed in the holds of the vessel where fish are held in refrigerated sea water.

Although it seems unlikely that future vessels will be equipped to discharge salmon in this way, the Derek Todd installation has provided much useful information which has been incorporated into the design of succeeding pumps.

The fishing company which owns the Derek Todd soon developed a successor to that pump. It was installed on a barge to serve as fish unloader for a fleet of fishing vessels and collectors.

Barge Pump: This pump combines a suction system for sucking up fish from the hold in a stream of water, with the pressure discharge system used on the first pump. Two pressure tanks are used alternately to provide continuous unloading, one tank being filled with fish, while the other one is emptied. The piping system employs swing check valves, and butterfly valves to reverse the flow and bypass the pump.

Most of the problems encountered in the design of the second pump and in early trials have now been overcome, and satisfactory performance has been achieved during the last two seasons. Maximum fish unloading rate is about 60 short tons of fish per hour. Salmon up to 30 pounds in weight are routinely handled and fish up to 60 pounds have been passed.

Provision for surplus water and tank storage had to be made. This was necessary to avoid pollution from harbor water, to simplify priming the system, and provide a jet of water for stirring up fish in the tanks, which is necessary for continuous unloading. This storage tank, plus the two main unloader tanks, together with the other equipment such as diesel engine, pumps, vacuum pump, etc., comprise a very heavy load for the barge.

Canada (Contd.):

In this system the fish must be introduced into a 10-inch pipe twice--the second time when leaving the tanks on the barge. Pumping rate for the circulating water is variable between 700 and 2,000 gallons per minute. Alternate cycles for loading and unloading the tanks are at two-minute intervals. The operator makes the necessary valve change manually. The single operator required for the barge pump stands on a small platform attached to the suction pipe just above the intake nozzle. From this position he can start or stop the pump, raise or lower the intake or rotate the nozzle, and direct the flow of returning water to ensure continuous fish unloading. This arrangement facilitates removal of surplus ice and flushing out of the fish hold.

Power is supplied by a 90-horsepower diesel engine and most of the components are direct driven from it.

Laboratory Design for Improved Water Suction Pump: The next pump is one developed at the Vancouver laboratory of the Fisheries Research Board of Canada. This pump was developed simultaneously with the previous one, but with the intention of rectifying or eliminating some of the less desirable features of the "barge" pump which were evident even before it was built. At the present time, the new laboratory pump has not been fully proven and further development work is needed. However, a pilot model performed very well, as did the prototype during brief trials. The pump resembles the previous one in that there are two chambers with screens for collecting fish, and check valves and butterfly valves are used to alternately direct the flow of water to certain points in the system. However, the fish-collecting chambers are much smaller in this model and the internal diameter remains 10 inches. Since each of these chambers holds only 25 fish per cycle, alternate cycles occur much more frequently--at full capacity the cycles being about 25 seconds for filling the first chamber, followed by 5 seconds for the unloading cycle. Automatic control of the system is achieved through a differential pressure controller which actuates a compressed-air operated ram to change the valve settings.

The features of this pump are: (1) It is relatively small and requires little auxiliary equipment, although it is a full-sized pump having an output of 30 tons per hour. (2) Out-

put can be regulated through the pressure controller. (3) After the fish enter the 10-inch intake, no subsequent reorientation is needed. (4) Little, if any, make-up water is required so that when unloading from refrigerated sea water carriers there is little heating of the circulating water, a very desirable feature if further storage on shore is necessary. (5) Because of its relatively small size, the pump can be mounted for raising or lowering and tidal changes need not affect it. (6) Pump motor size is 30 horsepower for a 6-inch centrifugal pump having an output of 1,500 gallons per minute against a 60-foot head.

"Air-Lift" Pump: Finally there is the "air-lift" pump which is also an experimental model developed at the Vancouver laboratory. Air-lift pumps have long been used for pumping from wells and in other applications requiring pumping from considerable depths. The equipment required is simple and inexpensive and satisfactory flow rates are achieved if the necessary submergence can be obtained.

The operation of these pumps depends on the introduction of air into a pipe below the surface of the liquid at a depth approximately twice the distance that the liquid is to be lifted above its surface. The density of the column of air and liquid in the pipe is thus reduced below that of the liquid outside and a continuous flow results. The unique feature of the air-lift system developed in Vancouver for use in elevating fish, is the creation of a "false" submergence by connecting a second vertical tube to the first with a return bend. By introducing air into the discharge leg of this U-tube at a suitable depth, a mixture of water and fish can be pumped from near the surface to a higher level. Further, by adding a syphon to the intake leg of the U-tube, fish can be pumped from the hold of a vessel onto a wharf providing the water is deep enough to obtain the necessary submergence. This depth of water can also be obtained by sinking a caisson beside the wharf.

Some advantages of the air-lift pump over other types are: (1) It is inexpensive to build, cost of the rigging being the major item. (2) The fish do not meet any restrictions after they enter the intake. They do not encounter any such devices as check valves, screens, or airlocks. Consequently the likelihood of physical damage is greatly diminished. (3) A skilled operator is not required since there

Canada (Contd.):

are no timing devices or stages. As has been pointed out, most of the other pumps utilize either airlocks or valve arrangements to transfer the fish from suction to discharge. (4) The estimated unloading rate is approximately 30 tons per hour.

Note: For additional information write to the Canadian Department of Fisheries, Director of Information and Education Service, Ottawa, Canada.

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BULK HANDLING OF HERRING MEAL TESTED IN BRITISH COLUMBIA:

Work is being carried out in British Columbia to develop suitable handling, storage, and loading devices for herring meal in bulk. Recent investigations by the Fisheries Research Board of Canada established the antioxidant BHT (Butylated Hydroxytoluene) to be effective in reducing oil oxidation and attendant "heating" in herring meal. This led to the introduction in 1965 of experimental bulk handling and shipping of BHT-treated meal by a fish meal plant. Preliminary tests using large cartons were followed by successful bulk shipments to the United States of 250 tons of meal in railway hopper cars. (Trade News, Canadian Department of Fisheries, December 1965.)



Chile

REAPPEARANCE OF ANCHOVY PREVENTS CLOSURE OF FISH MEAL PLANT:

A mass reappearance of anchovy off the Chilean coast in December 1965 came in time to prevent the closing of the fish-meal processing factory at Iquique operated by South African fishery interests. This was revealed by the Chairman of a South-West African firm with an interest in the Iquique plant. The Chairman had indicated to shareholders earlier that if no fish of any consequence were caught in December 1965, the factory would be put on a care-and-maintenance basis.

Reporting on the favorable turn of developments, the Chairman advised stockholders on February 2, 1966, as follows: "Fishing has improved considerably, and your plant has processed over 20,000 metric tons since December 8. This tonnage handled is in excess of the total amount processed during the first 11 months of last year. I must point out,

however, that it now appears that this is a seasonal fishery and we cannot expect heavy fishing during the winter months. We have now covered all our outstanding fish meal commitments and thus are in a position to take advantage of the considerably higher fish-meal prices presently appertaining on world markets." (The South African Shipping News and Fishing Industry Review, February 1966.)

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INAUGURATION OF ANCHOVY CONSERVATION:

Following the establishment of a conservation program in Peru, the Government of Chile recently took the first official action to protect Chilean anchovy resources. Supreme Decree 118 (Ministry of Agriculture) of March 4, 1966 (Diario Oficial of March 28) prohibits the "extraction, sale, purchase, transport and possession: of anchovy less than 12 centimeters (about 4.7 inches) long; a tolerance of 20 percent is allowed in the catch.

Although this is the first official conservation measure introduced for the anchovy, the industry had previously attempted to limit the size of the fish taken through an unofficial program of voluntary restraints. The decree establishes no sanctions, and enforcement is recognized as still a major problem. (United States Embassy, Santiago, April 4, 1966.)



Colombia

JAPANESE TUNA ENTERPRISE FAILS TO MATERIALIZE:

A Japanese-Colombian joint tuna enterprise was to be established in Colombia. This information was based on an article in the Japanese periodical Suisan Kezai Shim-bun of November 25, 1965. It has since been reported that this enterprise failed to materialize.

Note: See Commercial Fisheries Review, February 1966 p. 56.



Cuba

ADDITIONS TO CUBAN FISHING FLEET:

On March 20, 1966, the first of the six cod-fishing trawlers built for the Cuban Na-

Cuba (Contd.):

tional Fishing Institute by Vigo (Spain) shipyards arrived in the Havana fishing port. Named Manjuari, the trawler is manned by 56 men, including 9 officers. The captain and chief mate of the Manjuari are Soviet citizens, the rest are Cubans. The trawler will operate primarily in the Northwest Atlantic, off Newfoundland and Labrador Peninsula.

On March 25, 1966, a 575-ton tuna fishing vessel (the Jurel) was launched for Cuba in Bilbao, Spain, shipyards, the Associated Press reported.

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FISHERY LANDINGS IN 1965:

At a Cuban National Fishing Institute press conference in Havana, preliminary data on Cuban fisheries were reported. Total fishery landings in 1965 amounted to about 40,000 metric tons, about 10 percent more than the 36,300 tons in 1964. Fishing cooperatives (similar to Soviet "kolkhozes") in 1965 landed about 32,000 tons and the state-owned deep-sea fleet about 8,000 tons. Cooperatives' catch included about 9,000 tons of spiny lobsters, mostly for export.

Over 600 small vessels have been added to the Cuban fishing fleet. Cuba now has on order 20 tuna clippers and 6 cod-fishing trawlers in Spain in addition to a stepped-up program of domestic vessel construction. These additions are bound to increase Cuban high-seas landings considerably; 1966 plan for the state-owned fleet provides a catch of 17,000 tons or about 130 percent over last year's. To satisfy the need for crews, over 3,000 students are presently training in various fishery institutes, schools, and training centers; several hundred of these study in the U.S.S.R.

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HAVANA FISHING PORT:

Havana's fishing port will be finished on or about July 26, 1966, to celebrate the Cuban revolutionary holiday, according to Cuban sources. Built at a cost of 30 million pesos (US\$30 million), the Havana port will accommodate 130 medium-sized (250-600 gross tons) Cuban and Soviet fishing vessels.

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IMPORTS OF MOROCCAN FISH MEAL:

Morocco plans to export about 4,000 metric tons of fish meal to Cuba in 1966. Those exports were included in a trade agreement signed between Morocco and Cuba in February 1965. (United States Embassy, Rabat, February 4, 1966.)

Editor's Note: In the past, Morocco also exported to Cuba large amounts of canned sardines and small quantities of canned mackerel and canned tuna.

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SERVICING OF SOVIET FISHING VESSELS:

An agreement was signed at Havana on February 4, 1966, between Cuba and the Soviet Union providing for the servicing of the Soviet fishing fleet in the newly constructed fishing port at Havana. Built with Soviet assistance, the Havana fishing port is the largest in Latin America. Its ship repair yards, floating dock, and cold-storage plant are fully operational. A communications center was being installed.

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SHELLFISH EXPORTS TO FRANCE:

In January 1966, France imported from Cuba fresh and preserved crustaceans valued at 705,000 F (US\$143,000) and natural sponges valued at 123,000 F (US\$25,000). (United States Embassy, Paris, March 22, 1966.)

Editor's Note: Crustaceans exported were no doubt spiny lobsters.

DenmarkFISHERY LANDINGS, PRICES, PROCESSING, AND FOREIGN TRADE IN 1965 AND OUTLOOK FOR 1966:

Catch: Landings of fish in local ports by Danish fishing craft during 1965 were 3 percent less than in 1964, according to preliminary data (table 1). A poor last quarter was responsible for the first annual catch decline since 1960. There was a decline in the catch of herring, industrial fish, flatfish, brisling, eel, Norway lobster, and starfish. But landings were up for cod, cod-like fish, mackerel, salmon, deep-water shrimp, and mussels. Production of pond trout set a new record.

than in 1964 (table 3). The overall production of fresh and frozen fillets (including blocks) was up substantially. Increased production of cod and herring fillets more than

Table 3 - Danish Production of Processed Fishery Products,
1964-1965

Product	1965	1964
	.. (Metric Tons) ..	
Canned Products:		
Herring & sprat	2, 805	2, 868
Mackerel	1, 897	2, 148
Other fish	3, 912	4, 196
Shellfish	1, 300	994
Mussels	710	633
Total canned	10, 624	10, 839
Semipreserved Products:		
Herring & sprat	5, 596	4, 800
Other fish	506	382
Mussels	748	628
Total semipreserved	6, 850	5, 810
Fresh & Frozen Fillets:		
Cod	26, 596	20, 873
Cod-like ^{1/}	3, 300	1, 415
Plaice	17, 054	18, 556
Other flatfish	2, 151	1, 236
Herring	51, 538	35, 997
Other fish	114	163
Total fresh and frozen fillets	100, 753	78, 240
Smoked Products:		
Herring & sprat	2, 067	2, 001
Mackerel	1, 783	1, 808
Eel	715	705
Salmon & trout	767	514
Other fish and shellfish	235	196
Total smoked	5, 567	5, 224
Miscellaneous Products:		
Force meat ^{2/}	1, 979	1, 708
Salted herring	159	127
Dry-salted cod	186	417
Other fishery products	1, 598	1, 279
Total miscellaneous	3, 922	3, 531
Industrial Products:		
Meal	112, 700	108, 030
Oil	39, 733	31, 801
Ensilage ^{3/}	5, 969	7, 240
Solubles	16, 822	11, 829
Total industrial	175, 224	158, 900

1/Haddock, coalfish, hake, ling, etc.
2/Groundfish, milk, and flour.
3/Chemically-treated raw fish.

Source: Danish Ministry of Fisheries.

Danish landings in foreign ports were down 13 percent as a result of unloading difficulties in Great Britain. Landings by foreign fishermen (mostly Swedish) in Danish ports were slightly higher.

Prices: The ex-vessel prices paid for landed fish were generally higher during 1965. Table 2 shows monthly prices for selected species for July-December 1965 as well as the price range for July-December 1964.

Processing: Danish production of most processed fishery items was higher in 1965

Table 2 - Danish Ex-Vessel Average Prices During July-December 1965 and Price Range for July-December 1964

Species	1965						July-December 1964	
	July	August	September	October	November	December	High	Low
	..... (U. S. Cents Per Pound)						(U. S. Cents Per Pound)	
Cod, drawn	6.5	6.7	7.3	7.3	8.6	8.7	8.4	5.7
Plaice, drawn . . .	16.3	17.4	19.6	19.1	20.2	19.1	15.1	11.1
Industrial fish . . .	1.6	1.8	1.9	2.0	2.1	2.0	1.5	1.2
Herring for food . .	6.5	6.3	6.2	5.5	5.6	6.3	5.1	4.1
Turbot	47.6	49.1	49.7	44.5	44.6	39.9	43.2	33.1
Salmon	92.5	85.2	86.6	87.0	110.4	123.7	131.5	101.8
Haddock	6.1	6.2	7.0	6.3	9.4	10.0	7.8	6.0
Coalfish	5.2	5.5	8.9	10.0	12.3	12.6	13.1	6.1
Common sole	76.9	81.0	82.9	67.6	61.2	75.1	100.6	76.0
Eel, silver	-	64.8	58.4	-	89.8	88.0	88.4	50.2
Eel, yellow	-	48.6	46.4	-	46.2	47.7	46.0	39.9
Norway lobster . . .	47.6	51.0	49.8	45.6	49.8	57.9	50.3	26.4
Lobster	145.4	137.6	130.1	104.1	89.3	93.0	136.5	84.5
<u>Shrimp:</u>								
deep-water	23.9	28.4	28.2	25.5	29.9	37.8	40.3	32.7
ordinary	43.7	73.5	89.8	91.3	-	-	106.4	58.5
Dogfish	-	-	-	-	7.8	9.9	7.0	6.5

Source: Danish Ministry of Fisheries.

Denmark (Contd.):

offset a slight decline in that of plaice fillets. More fish meal, oil, and solubles were produced in 1965 despite a poor last quarter. The

quantity of smoked and semipreserved products increased, but that of canned fish was down slightly because of lower production of herring, sprat, mackerel, and other fish items such as tuna, trout, liver, and roe.

Table 4 - Danish^{1/} Fishery Exports by Commodity, 1965

Product	Exports in 1965			Change from 1964	
	Quantity	Value		Quantity	Value
		Kr. 1,000	US \$1,000		
Fresh Products:	Metric Tons			.. (Percent) ..	
Herring and sprat	55,369	61,246	8,881	-27	- 2
Fillets	52,480	108,520	15,735	+18	+39
Plaice	8,097	22,853	3,314	-33	-18
Cod	7,681	19,297	2,798	-20	-11
Pond trout	6,949	43,809	6,352	+23	+ 6
Eels	3,493	39,659	5,751	- 6	+ 8
Offal	17,574	7,998	1,160	+ 2	+14
Other	29,899	94,425	13,692	- 3	+14
Total fresh products	181,542	397,807	57,683	- 9	+11
Frozen Products:					
Herring and sprat	4,537	4,980	722	-28	-15
Fillets	38,629	174,481	25,300	+10	+29
Pond trout	3,793	26,940	3,906	+50	+32
Other	5,323	26,375	3,824	- 8	+35
Total frozen products	52,282	232,776	33,752	+ 5	+28
Salted Products:					
Wet-salted cod	3,604	10,268	1,489	- 6	- 1
Dry-salted cod	1,638	8,071	1,170	+41	+52
Other	964	4,487	651	+ 9	+40
Total salted products	6,206	22,826	3,310	+ 5	+21
Smoked Products:					
Salmon and trout	381	9,389	1,361	+44	+29
Other	377	2,008	291	+ 3	+ 6
Total smoked products	758	11,397	1,652	+20	+24
Canned Products:					
Fish:					
Sprat and herring	3,696	13,481	1,955	-16	-11
Mackerel	553	2,334	339	+21	+15
Other	1,444	6,293	912	+15	+18
Total canned fish	5,693	22,108	3,206	- 7	- 2
Shellfish:					
Shrimp	896	10,456	1,516	+55	-54
Mussels	923	4,113	596	+58	+61
Other	9	116	17	-50	-66
Total canned shellfish	1,828	14,685	2,129	-55	+52
Semipreserved Products:					
Fish:					
Caviar	526	7,184	1,042	+58	+57
Sølaks ^{2/}	171	1,614	234	+61	+47
Herring	670	1,964	285	+83	+92
Sprat, spiced	69	174	25	-80	-73
Other	534	3,238	469	+38	+50
Total semipreserved fish	1,970	14,174	2,055	+29	+49
Shellfish:					
Shrimp	205	4,498	652	+27	+49
Mussels	769	3,154	458	+10	+14
Other	2	30	4	-30	-52
Total semipreserved shellfish	976	7,682	1,114	+13	+31
Industrial Products:					
Herring meal	64,380	84,784	12,294	+14	+37
Other fish meal	4,735	5,683	824	- 4	+22
Fish solubles	24,090	12,917	1,873	+39	+47
Fish ensilage	91	55	8	-54	-38
Trout food ^{3/}	341	566	82	+349	+229
Fish oil	51,791	70,876	10,277	+71	+104
Total industrial products	145,428	174,881	25,358	+33	+59
Grand total	396,683	898,336	130,259	+ 6	+24

^{1/}Includes direct shipments from Greenland.

^{2/}Coalfish or saithe (colored to simulate salmon).

^{3/}Includes small quantity of animal food.

Note: Export data include direct landings by Danish vessels in foreign ports, which in 1965 included 2,884 tons delivered to the United Kingdom, 482 tons to Norway, 303 tons to Sweden, and 29 tons to the Netherlands.

Source: Danish Ministry of Fisheries.

Denmark (Contd.):

Exports: For the year 1965, Danish fishery products were again exported in record amounts with a 6-percent increase in quantity and a 24-percent increase in value (table 4.) The amount of fresh fish exported declined 9 percent mainly due to the continued exportation of less herring in the round and more as fillets. The value of frozen fillet exports increased 29 percent on a 10-percent gain in quantity, as increased demand resulted in higher prices for cod, plaice, and herring fillets. More smoked salmon, caviar, solaks (salmon substitute), shrimp, mussels, and other higher-priced fishery products were exported--a reflection of rising European purchasing power. The average prices received for exports of fish meal, solubles, and oil were up 21 percent, 6 percent, and 19 percent, respectively, as world market prices for industrial products increased in 1965.

The European Common Market once again was the best market for Danish fishery products, accounting for 44 percent of the value of the 1965 exports (table 5). Denmark's

Table 5 - Value of Danish Fishery Exports^{1/} by Areas and Major Countries, 1965

Destination	1965		Change from 1964
	Kr. 1,000	US\$ 1,000	Percent
By Areas:			
Common Market (EEC)	362,000	52,490	+18
European Free Trade Assn. (EFTA)	325,000	47,125	+21
East Bloc	34,000	4,930	- 3
Other countries	106,000	15,370	+29
Total^{1/}	827,000	119,915	+20
By Leading Countries:			
West Germany	244,000	35,380	+24
United Kingdom	138,000	20,010	+ 5
Sweden	110,000	15,950	+39
United States	60,000	8,700	+82
Switzerland	51,000	7,395	+28
Italy	47,000	6,815	+ 7
Belgium	26,000	3,770	+24
Netherlands	23,000	3,335	+15
France	22,000	3,190	-12
Czechoslovakia	12,000	1,740	+71

^{1/}Fish oil exports not included; as a result, total does not compare with that in table 4.

Source: Danish Ministry of Fisheries.

EFTA partners accounted for 39 percent. Exports to the East Bloc countries dropped slightly. By country, West Germany was the leading buyer, followed by the United Kingdom, Sweden, and the United States. The major share of exports to West Germany consisted of fresh herring, herring fillets, and eel. Flatfish, cod, cod-like fish, and pond trout comprised the bulk of the exports to the United Kingdom. Sweden took a wide variety of

products. Herring and fish meal accounted for most of the sales to the East Bloc.



Fig. 1 - Fishing cutters at the dock in Kalundborg, one of the smaller Danish fishing ports.



Fig. 2 - Gammel Strand fish market in Copenhagen. Live eel and plaice are sold in this market. Copenhagen is a market for fishery products rather than an important fishing port.



Fig. 3 - Plaice hung out for drying--dried plaice is a specialty known all over Jutland.

Denmark (Contd.):

Exports to the United States: Danish exports to the United States in 1965 rose 80 percent in quantity and 82 percent in value (table 6). The sharp rise was due mainly to larger shipments of cod fillets and blocks. Improved landings of cod in Greenland and higher prices offered by U. S. importers contributed to the increase.

Export Outlook for 1966: The quantity of fish exported in 1966 by Denmark is expected to be about the same as in 1965 though the value of the exports may be slightly more. This forecast is based on the lack of any significant improvement in the catching power of the fleet, the continuing difficulty in recruiting fishermen, and the apparent shortage of plaice. Food fish prices should continue at current relatively high levels and possibly increase if prices of competing foods do not decline. On the other hand, in early 1966, world prices for fish meal and solubles showed some decline from the high levels of 1965.

The value of trout exports should be greater, perhaps even for a somewhat lower quantity. Trout prices have recovered from the low 1965 levels.

No Common Market action is expected this year which would adversely affect the important sale of herring products to West Germany. Prices for specialty fish products such as caviar, smoked salmon, eel, and mussels may rise during 1966 due to the high level of consumer purchasing power in Europe.

Danish processors and exporters are continuing to press for liberalization of fresh fish landings by foreign fishermen and other imports to augment supplies of domestic raw fish for processing. In March 1966, Denmark allowed the importation, thawing, boning, re-freezing and exportation to West Germany of 100 tons of cod blocks originally frozen aboard West German factory trawlers.

Imports: Danish imports of fishery products in 1965 rose 15 percent in quantity and

Table 6 - Danish Fishery Exports to the United States^{1/}, 1965

Product	Exports in 1965			Change from 1964	
	Quantity Metric Tons	Value		Quantity .. (Percent) ..	Value
		Kr. 1,000	US \$1,000		
Fresh & Frozen Products:					
Pond trout	699	4,115	597	+ 33	+ 6
Salmon ^{2/}	50	491	71	2/	2/
Trout eggs	1	89	13	+ 0	+ 19
Flatfish	177	1,858	270	- 25	- 12
Fillets:					
Flatfish	274	871	126	+ 23	+ 11
Cod	10,536	39,331	5,702	+115	+156
Other	690	2,474	359	+ 51	+ 54
Norway lobster	167	4,604	668	- 16	+ 17
Other	3/	2	4/	-	-
Total fresh and frozen	12,594	53,835	7,806	+ 93	+ 94
Salted Products:					
Wet-salted cod	7	30	4	- 84	- 74
Salted herring	44	148	22	+ 29	+ 90
Total salted	51	178	26	- 35	- 15
Smoked Products	2	50	7	- 11	+ 9
Canned Products:					
Sprat & herring	507	2,708	393	- 11	- 3
Mackerel	26	181	26	+ 37	+ 65
Other fish	10	78	11	- 39	- 20
Shrimp	122	1,376	200	+ 4	+ 16
Mussels	152	706	102	+158	+ 92
Total canned	817	5,049	732	+ 5	+ 11
Semipreserved Products:					
Caviar	25	302	44	+ 92	+ 33
Other fish	1	8	1	+ 0	- 37
Shrimp	7	111	16	+600	+484
Total semipreserved	33	421	61	+120	+116
Fish Solubles	600	642	93	+ 50	+ 68
Grand total	14,097	60,175	8,725	+ 80	+ 82

^{1/}Does not include exports to Puerto Rico.

^{2/}Greenland salmon; data for 1964 not available.

^{3/}Less than one metric ton.

^{4/}Less than \$500.

Note: Exports shown include direct shipments from Greenland in 1965 as follows: cod fillets 4,986 tons, flatfish fillets 257 tons, other fish fillets 681 tons, and semipreserved shrimp 4 tons.

Source: Danish Ministry of Fisheries.

Denmark (Contd.):

35 percent in value (tables 7 and 8). The principal imports were fresh herring landed directly in Danish ports by Swedish fishermen, fish oils, fish meal, fresh and frozen eel, spiced and salted herring and herring-like fish, and fish offal.

Fresh herring is imported mainly for filleting and re-export, principally to West Germany. Imports of fish meal and fish oil (principally herring oil from Iceland and anchoveta oil from Peru) are used domestically and also re-exported. Large quantities of salted herring and herring-like fish (sprat and anchovy) are imported for further proc-

Table 7 - Danish Imports of Fishery Products, 1962-1965

Products	1965			1964			1963			1962		
	Quantity Metric Tons	Value		Quantity Metric Tons	Value		Quantity Metric Tons	Value		Quantity Metric Tons	Value	
		Kr. 1,000	US \$1,000		Kr. 1,000	US \$1,000		Kr. 1,000	US \$1,000		Kr. 1,000	US \$1,000
Fresh or frozen:												
Fish	166,676	163,450	23,700	155,994	129,189	18,732	132,431	97,855	14,189	103,720	102,548	14,869
Shellfish	268	3,386	491	450	3,591	521	574	3,584	520	398	2,857	414
Salted or smoked:												
Spiced & salted herring, etc.1/	4,103	9,166	1,329	4,265	8,397	1,218	4,429	8,633	1,252	3,735	7,196	1,044
Wet- and dry- salted cod	2,180	7,713	1,119	1,170	4,614	669	3,400	3,400	493	499	1,212	176
Other2/	473	4,277	620	223	971	141	113	318	46	126	337	49
Canned and semipreserved:												
Fish	1,269	7,590	1,101	1,306	8,310	1,205	1,194	5,582	809	1,101	5,435	788
Shellfish	715	9,610	1,393	731	9,518	1,380	383	6,127	888	285	4,075	591
Industrial products:												
Fish meal	20,835	28,220	4,092	18,626	20,835	3,021	12,309	11,914	1,728	15,520	16,616	2,410
Herring oil	28,885	41,722	6,050	11,521	15,304	2,219	2,545	2,399	348	11,861	1,505	218
Medicinal oil	2,281	4,271	619	2,570	4,724	685	2,557	3,837	556	2,439	3,218	467
Other marine oil . . .	13,890	20,260	2,938	14,089	18,072	2,620	19,032	12,211	1,771	17,738	14,215	2,061
Fish offal	41,735	17,292	2,507	23,920	9,648	1,399	16,448	6,349	921	11,476	4,083	592
Other fishery products	34,739	16,741	2,427	40,902	16,661	2,416	9,349	4,755	689	4,656	3,578	519
Total imports . . .	318,049	333,698	48,386	275,767	249,834	36,226	202,576	166,964	24,210	163,554	166,880	24,198

1/Herring, sprat, & anchovy--does not include items classified as semipreserved.

2/Mainly smoked but also other types of preparation; mostly fish roe.

Note: Products originating in Greenland or the Faroe Islands are not included.

Source: Danish Statistical Department.

Table 8 - Danish Imports of Fishery Products, by Commodity and Country, 1965

Product	Iceland	Norway	Sweden	Nether- lands	United Kingdom	West Germany	United States	Other Countries	Total 1965		
									Quantity Metric Tons	Value	
										Kr. 1,000	US \$1,000
Fresh or frozen:											
Fish	1,125	2,015	159,332	1,724	342	977	38	1,123	166,676	163,450	23,700
Shellfish	1	118	75	29	3	2	14	26	268	3,386	491
Salted or smoked:											
Spiced & salted herring, etc.1/	2,771	461	495	321	35	-	-	20	4,103	9,166	1,329
Wet- and dry-salted cod	276	1,306	-	2	-	-	-	596	2,180	7,713	1,119
Other2/	371	57	6	-	2	-	-	37	473	4,277	620
Canned and semipreserved:											
Fish	4	97	84	1	12	2	63	1,006	1,269	7,590	1,101
Shellfish	37	120	8	-	-	-	310	240	715	9,610	1,393
Industrial products:											
Fish meal	11,102	9,732	1	-	-	-	-	-	20,835	28,220	4,092
Herring oil	24,996	51	-	-	-	3,838	-	-	28,885	41,722	6,050
Medicinal oil	681	1,179	-	-	53	346	-	22	2,281	4,271	619
Other marine oil	83	583	19	-	2	19	-	3/13,184	13,890	20,260	2,938
Fish offal	497	710	473	5,860	455	32,537	-	1,203	41,735	17,292	2,507
Other fishery products . .	-	1,267	4/26,202	2,166	712	3,819	181	392	34,739	16,741	2,427
Total 1965	41,944	17,696	186,695	10,103	1,616	41,540	606	17,849	318,049	333,698	48,386
Total 19645/	28,115	11,651	184,211	3,032	1,137	28,753	2,519	16,360	275,778	249,419	36,166

1/Herring, sprat, and anchovy--does not include items classified as semipreserved.

2/Mainly smoked but also other types of preparation; mostly fish roe.

3/Includes 13,033 metric tons of refined fish oil from Peru valued at Kr.18.7 million (\$2.7 million).

4/Primarily fish for reduction.

5/Slight discrepancy from 1964 data shown in Table 7.

Note: Products originating in Greenland or the Faroe Islands are not included.

Source: Danish Statistical Department.

Denmark (Contd.):

essing into semipreserved specialties consumed in Denmark. Fish offal, primarily selected cod waste, is imported by Denmark's important mink-raising industry.

Imports from the United States: The quantity and value of fishery products imported from the United States in 1965 fell 82 percent and 31 percent, respectively (table 9). In 1965, there were no imports of menhaden oil, which in previous years accounted for the major share of all imports from the United States.

King crab, shrimp, and salmon accounted for most of the imports from the United States



Fig. 4 - Tuna fishery in Oresund. Bluefin tuna landings in Denmark vary considerably from year to year. Most of the catch is made in the North Sea.

in 1965. All the king crab and much of the shrimp and salmon were of Alaskan origin. Among other U. S. fishery products from which a market might be developed in Denmark (and other European countries) are Maine lobsters, eel, scallops, and oysters.

Import Outlook for 1966: The Danish Ministry of Commerce issued a decree on December 21, 1965, liberalizing the importation



Fig. 5 - Danish fisherman standing on a typical live box or float in which live plaice are held for marketing in Fredrikshavn.

Table 9 - Danish Imports of Fishery Products From the United States, 1964-1965

Products	1965			1964		
	Quantity Metric Tons	Value		Quantity Metric Tons	Value	
		Kr. 1,000	US\$1,000		Kr. 1,000	US\$1,000
Fresh or frozen:						
Salmon, fresh or chilled	14.9	130.3	18.9	0.5	9.1	1.3
Salmon, frozen	23.3	245.7	35.6	38.6	415.7	60.3
Shrimp	14.2	215.5	31.2	0.1	2.4	0.3
Other fresh and frozen	0.1	2.6	0.4	0.6	10.2	1.5
Salted or smoked:	-	-	-	0.8	10.2	1.5
Canned:						
Salmon	57.5	430.8	62.5	27.7	172.5	25.0
Tuna	2.6	17.4	2.5	3.1	20.5	3.0
Shrimp	157.8	1,398.3	202.8	91.6	818.6	118.7
Crab	138.2	2,189.0	317.4	159.4	2,412.3	349.8
Other canned fishery products	2.6	34.7	5.0	10.1	112.4	16.3
Semipreserved:						
Fish	0.6	6.1	0.9	1.0	10.6	1.5
Shellfish	13.3	214.0	31.0	12.6	204.2	29.6
Industrial:						
Fish oil	-	-	-	2,072.4	2,871.2	416.3
Fish meal	0.3	1.0	0.1	-	-	-
Other	0.1	10.7	1.5	0.3	5.0	0.7
Total	425.5	4,896.1	709.8	2,418.8	7,074.9	1,025.8

Note: Does not include agar-agar or seaweed.

Source: Danish Statistical Department.

Denmark (Contd.):

of most of the remaining fresh and frozen fish and shellfish still restricted. A rise in the amount of food fish imported should result. Landings of fresh herring in Danish ports by Swedish fishermen, which account for a major share of the imports, were down in the first 2 months of 1966 as a result of bad weather. If the shortage of plaice landed by Danish vessels continues, more imports of plaice from the Netherlands will be needed to help processors meet export orders. If supplies of raw fish, especially cod, shrimp, and flatfish, landed by Danish fishermen are inadequate to meet processors needs, direct landings by foreign fishermen (as presently permitted in the case of Swedish herring) may be approved by the Danish Fisheries Ministry which has been favoring a more liberal attitude to such imports. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, February 23, March 24, and April 6, 1966.)

* * * * *

FISH MEAL, OIL, AND SOLUBLES PRODUCTION AND EXPORTS, FEBRUARY 1966:

In February 1966, Denmark produced 6,902 metric tons of fish meal, 8,826 tons of fish oil,

Danish Exports of Industrial Fishery Products, February 1966		
Country of Destination	Fish Meal ¹ /	Solubles
	. . . (Metric Tons) . . .	
Netherlands	-	85
Austria	20	-
United Kingdom	1,445	-
West Germany	140	1,783
Italy	40	-
Switzerland	300	-
Sweden	351	-
Poland	800	-
Czechoslovakia	300	-
Total	3,396	1,868
¹ /Mostly herring meal.		
Note: Danish exports of fish oil in January 1966 totaled 5,317 tons; fish oil export data for February 1966 not available.		

and 257 tons of fish solubles. (Regional Fisheries Attache, U. S. Embassy, Copenhagen, April 4, 1966.)

* * * * *

SMALL FISH MEAL PLANT FOR RESEARCH USE DEVELOPED:

A small fish-reduction plant--designed and built for research use with a capacity of 55 pounds of chopped fish per hour--is being marketed by a Danish research company.

The plant combines cooker, press, and dryer in one unit mounted on a wheeled frame for mobility. According to the company, the fish are processed exactly as in a large commercial plant so that realistic experimentation in cooking, pressing, and drying may be carried out on a small scale.

Main specifications of the plant are: cooker--indirect steam in jacket and rotor as well as direct steam, variable-speed drive; press--single screw, 1 to 4 ratio, variable-speed drive; and dryer--steam jacketed with steam-heated rotor, variable-speed filling.

The dimensions are 75 inches long by 31½ inches wide by 63 inches high. The price of the unit is US\$12,000 f.o.b. Esbjerg, Denmark. (Regional Fisheries Attache, U. S. Embassy, Copenhagen, March 14, 1966.)

* * * * *

SEALSKINS FROM GREENLAND AUCTIONED:

The Royal Greenland Trade Department held another of its regular auctions for Greenland sealskins on February 23, 1966, in Copenhagen, Denmark. Demand was good and prices were up.

The entire offering of about 28,100 sealskins (mostly ringed skins) was sold for a total of about US\$488,650. Prices were considerably above the prices for skins of comparable quality sold at the September 1965 auction. Ringed sealskin prices increased about 20 percent, harp 3 percent, bladder-nosed 10 percent, and saddle 18 percent. The best quality skins increased the most with some poorer quality skins declining in price. A few of the latter sold for only 30 cents a skin while numerous top-quality lots brought \$53.60 a skin. No sealskins from Alaska or Canada were offered.

All important foreign buyers were present. Representatives of large West German companies bought most of the coat skins, but the auction was well supported also by buyers from the French shoe manufacturing industry.

The next sale of Greenland sealskins by the Royal Greenland Trade Department is expected to be held September 14, 1966, preceded by a week of inspection of offerings.

January 1966 Greenland seal catches landed in Umanak were reported to be the best in

Denmark (Contd.):

25 years and said to be a sign that it is becoming colder in Greenland. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, March 3, 1966.)

Note: See Commercial Fisheries Review, December 1965 p. 53.

**Ecuador****LAW ON FOREIGN FISH LANDINGS:**

According to the legal advisor of the Ecuadoran Navy, the matter of landing fish from foreign vessels falls within Article 874 of the Ecuadoran Commercial Code which considers the landing of merchandise in general. Such a landing is permitted only when it is judged to be a "forced landing" for the following causes: (a) If the owners of the merchandise require that it be landed in order to prevent its damage or spoilage; (b) if the landing is absolutely necessary in order to repair the vessel; and (c) if it is recognized that the cargo has been damaged.

In addition, the landing of fish by Ecuadoran vessels in any foreign port must be made through previous conformance with the Ecuadoran export law. (United States Embassy, Quito, April 11, 1966.)

**East Germany****FISHING VESSELS SOLD TO DANISH AND SWEDISH FIRMS:**

An East German shipyard at Rossau on the Elbe River has contracted to deliver 8 small fishing vessels to Swedish firms during 1966, according to the Swedish press. The East German shipbuilder is also reported to have contracted to deliver 20 to 25 small stern trawlers to Danish firms. (Various sources.)

**Greece****FISHERY LANDINGS AND TRENDS, 1965:**

Greek fishery landings in 1965 were estimated at about 106,000 metric tons with an ex-vessel value of US\$41.6 million. That was

a gain of 1.4 percent in quantity and 19.6 percent in value over the previous year.

Landings from the Atlantic in 1965 totaled 27,073 tons (up 29 percent) with an ex-vessel value of \$10.5 million. The increase reflected the buildup of the Greek freezer-trawler fleet from 27 to 32 vessels during 1965.

The 1965 landings also included a Greek coastal catch of about 67,000 tons (same as in 1964), a Mediterranean catch of 4,000 tons (down 88 percent), and an inland catch of 8,500 tons (down 12 percent). United States Embassy, Athens, March 8, 1966.)

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FROZEN FISH IMPORTS BANNED:

The issuance of import permits for frozen fish was suspended by the Greek Ministry of Commerce as of March 17, 1966, until further notice. The measure is intended to allow the sale of large stocks of frozen fish, estimated at 12,000 metric tons, brought in by Greek deep-sea trawlers. The measure primarily affects Japanese fish imports into Greece. Sale prices for the various kinds of fish were pegged at the maximum prices on March 4, 1966. (United States Embassy, Athens, March 25, 1966.)

**Guinea****FISHERY AID BY SOVIETS:**

Soviet aid to Guinean fisheries was promised in an Agreement on Cooperation in Marine Fisheries, signed in Conakry in February 1966. Under the Agreement, the U.S.S.R. will: (1) Supply Guinea 10 fishing vessels and provide technical experts for 3 years to train Guineans how to use and repair them; (2) Accept 60 Guinean students and apprentice fishermen to train in Soviet fishery schools and universities. (Tass, February 2, 1966.)

**Iceland****EXPORT STOCKS OF PRINCIPAL FISHERY PRODUCTS, FEBRUARY 28, 1966:**

As of February 28, 1966, Iceland's stocks of frozen groundfish (fillets) for export to the United States totaled 1,662 metric tons, a gain

Iceland (Contd.):

Icelandic Export Stocks ^{1/} of Principal Fishery Products, February 28, 1966			
Item	Quantity	Value	
		Metric Tons	US\$ 1,000
Groundfish, frozen:			
for export to:			
U.S.	1,662	43.2	1,003.2
other countries	2,518	46.7	1,084.5
Stockfish	500	16.5	383.2
Herring, frozen	2,030	12.8	297.2
Industrial products:			
fish meal:			
herring	16,418	137.9	3,202.5
other fish	7,802	56.3	1,307.5
herring oil	17,665	143.1	3,323.3
^{1/} Includes only stocks intended for export.			
Note: Icelandic kronur 43.06 equal US\$1.00.			

of 107 tons from the stocks on hand January 31, 1966. (United States Embassy, Reykjavik, April 5, 1966.)

EXPORTS OF FISHERY PRODUCTS, 1964-65:

During 1965, there was a considerable increase in Iceland's exports of herring oil, herring meal, and iced fish (including herring) as compared with 1964, according to the Ice-

Icelandic Fishery Exports, 1964-65						
Product	1965			1964		
	Qty.	Value f.o.b.		Qty.	Value f.o.b.	
	Metric Tons	1,000 Kr.	US\$ 1,000	Metric Tons	1,000 Kr.	US\$ 1,000
Salted fish, dried	2,554	51,888	1,205	1,138	28,154	653
Salted fish, uncured	25,990	439,941	10,217	23,955	371,321	8,615
Salted fish fillets	1,882	33,199	771	1,428	21,839	507
Wings, salted	1,486	20,109	467	1,173	14,765	343
Stockfish	12,243	375,944	8,731	11,580	337,403	7,828
Herring on ice	11,553	8,014	188	392	1,104	26
Other fish on ice	56,529	187,899	4,364	34,512	215,039	4,989
Herring, frozen	25,621	164,033	3,809	21,991	129,918	3,014
Other froz. fish, whole	7,554	96,649	2,244	4,814	53,050	1,231
Frozen fish fillets	49,125	1,148,033	26,661	54,095	1,096,264	25,433
Shrimp & lobster, froz.	1,002	129,810	3,015	1,171	109,926	2,550
Roes, frozen	2,255	34,602	804	1,703	27,900	647
Canned fish	682	32,637	758	381	20,067	466
Cod-liver oil	6,399	68,248	1,585	9,815	91,717	2,128
Lumpfish roes, salted	867	45,814	1,064	419	10,609	246
Other roes for food, salted	2,033	33,530	779	2,971	43,939	1,019
Roes for bait, salted	1,588	14,627	340	3,049	25,280	586
Herring, salted	39,027	491,054	11,404	46,223	517,085	11,996
Herring oil	82,172	677,627	15,737	52,403	417,619	9,689
Ocean perch oil	-	-	-	28	188	4
Whale oil	3,066	28,184	654	4,499	37,582	872
Fish meal	19,532	133,432	3,099	26,738	166,368	3,860
Herring meal	124,371	943,362	21,908	96,379	594,803	13,799
Ocean perch meal	3,258	24,201	562	2,265	13,239	307
Wastes of fish, froz.	9,148	34,046	791	7,165	22,967	533
Liver meal	607	4,311	100	575	3,827	89
Lobster & shrimp meal	50	231	5	156	686	16
Whale meal	1,363	8,593	200	1,387	7,698	179
Whale meal, frozen	2,660	23,878	554	2,277	18,167	421
Note: Values converted at rate of 1 krona equals 2.32 U. S. cents.						

landic Statistical Bulletin, February 1966. Exports of frozen fish fillets, cod-liver oil, and salted herring showed a decline in 1965.

FISHERY LANDINGS BY PRINCIPAL SPECIES, JANUARY-OCTOBER 1965:

Species	Jan. -Oct.	
	1965	1964
. . . (Metric Tons) . . .		
Cod	229,799	270,469
Haddock	46,290	48,992
Saithe	23,311	20,216
Ling	4,539	4,302
Wolfish (catfish)	7,482	8,159
Cusk	1,673	2,962
Ocean perch	27,677	25,174
Halibut	850	1,019
Herring	558,392	501,350
Capelin	49,612	8,640
Shrimp	632	348
Other	15,168	12,453
Total	965,425	904,084
Note: Except for herring which are landed round, all fish are drawn weight.		

UTILIZATION OF FISHERY LANDINGS, JANUARY-OCTOBER 1965:

How Utilized	Jan. -Oct.	
	1965	1964
. . . (Metric Tons) . . .		
Herring and Capelin ^{1/} for:		
Oil and meal	531,338	436,003
Freezing	18,836	20,570
Salting	57,328	53,199
Groundfish ^{2/} for:		
Fresh on ice	29,272	31,671
Freezing and filleting	172,417	173,935
Salting	84,325	87,768
Stockfish (dried unsalted)	52,188	82,067
Canning	533	242
Oil and meal	2,760	3,455
Crustaceans for:		
Freezing	3,547	2,816
Canning	204	159
Home consumption	12,677	12,199
Total production	965,425	904,084
^{1/} Whole fish.		
^{2/} Drawn fish.		
Source: Icelandic Statistical Bulletin, February 1966.		

TRADE AGREEMENTS WITH EAST EUROPEAN COMMUNIST COUNTRIES:

U.S.S.R.: An Icelandic-Soviet trade agreement for 1966-1968 was signed in Moscow in mid-November 1965. The new agreement is of similar scope to previous Soviet-Icelandic trade protocols. Under the 1966-1968 agreement, the Soviet Union will purchase from Iceland annual quotas of 12,000-15,000 metric tons of frozen fish fillets, 5,000 tons of bulk frozen fish, 5,000 tons of frozen herring, 10,000-15,000 tons of salted herring, canned goods to a value of between 24 million and 33½ million kronur (US\$557,000-778,000), and various nonfish-

Iceland (Contd.):

ery items. In return Iceland will buy gasoline, fuel oil, machinery, vehicles, timber, iron, and steel.

Poland: A new trade agreement between Poland and Iceland was signed in November 1965 for 1 year providing for Polish exports of iron and steel (including slipways), timber, coal, textiles, and chemicals in return for Icelandic exports of salted herring, frozen fish, fish meal and oil, sheepskins, and other goods.

Czechoslovakia: After an official visit to Czechoslovakia in late 1965, the Icelandic Minister of Commerce expressed the hope that the next trade agreement between the two countries would be on a freer basis. The Director of the Czech trading organization Centrotex said during an October 1965 visit to Iceland that he hoped that trade with Iceland might be increased and that it would be possible to hold a Czech trade exhibition in Reykjavik in 1966. No doubt included in such an agreement would be exports of fishery products by Iceland. (*Icelandic Review*, vol. 3, no. 4, 1965.)



India

EXPANSION OF SHRIMP EXPORTS TO THE UNITED STATES:

India's shrimp exports to the United States may be expanded by a new contract with a New York City firm. Plans of that U. S. firm to contract with Kerala State, India, for the delivery of one million pounds of fishery products annually were announced in February 1966. A representative of the U. S. firm mentioned the need to modernize fish-processing methods in India to increase export earnings. The same theme was recently stated by an Indian shrimp packer in the article "Reorientation of Packaging Pattern for the U. S. Market," which appeared in the first issue (January 1966) of the *Seafood Trade Journal*, Cochin, India.

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FISHING CHART OF INDIA'S WEST COAST TO BE PUBLISHED BY NORWAY:

A fishing chart of the west coast off India is to be published by the Norwegian Agency for International Development for the use of India's growing fishing fleet.

The chart is being prepared by a Norwegian fisheries expert who spent four years with the Indo-Norwegian Project to develop the fishing industry along the south coast off India.

Of the 16 grounds to be shown on the chart, several were previously unknown. In particular, a rich belt of lobsters and shrimp at a depth of 1,800 feet will be indicated. The Norwegian Agency for International Development will distribute the chart free of charge to fisheries departments in Indian States who, in turn, will make them available to Indian fishing skippers.

The Indo-Norwegian Project, started in 1953, has set up six fishing stations in the States of Kerala, Mysore, and Madras with boat-building yards, ice factories, freezing plants, and insulated transport vans. (*Fishing News International*, February 1966.)

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FRESH-WATER FISHERIES DEVELOPMENT:

Under a special Indian Government development program, 43 fisheries projects, covering 9 states and costing US\$4.9 million have been undertaken. The program is designed to increase production through surveys, introduction of fish-culture techniques, investigation of fish breeding, and development of reservoir fisheries. (Editor's Note: India's fresh-water fisheries catch amounted to 459,900 metric tons in 1964, according to the Food and Agriculture Organization.)

On March 17, 1966, the Government of Uttar Pradesh, an inland state in northern India, announced the establishment of a state-owned Fisheries Corporation with an authorized capital of \$1.2 million to develop the State's inland fisheries resources. (United States Embassy, New Delhi, April 7, 1966.)



Ireland

FISHERIES EXPANSION IN 1965:

Irish fish consumption increased 11 percent in 1964 and 13 percent in 1965. Intensified promotion and better distribution were the main reasons for the gain. In early 1966, Dublin fish merchants reported that the relaxation of Catholic Lenten fast had caused no loss of business.

Ireland (Contd.):

Irish landings of finfish in 1965 amounted to 63.0 million pounds with an ex-vessel value of £1.3 million (US\$3.6 million) as compared with 54.6 million pounds valued at £1.1 million (\$3.0 million) in 1964. Irish shellfish landings were valued at slightly over £400,000 (\$1.1 million) in both 1964 and 1965.

The increased landings in 1965 can be attributed to the efforts of the Irish Sea Fisheries Board to encourage deep-sea fishing, mainly through financial assistance to fishermen purchasing vessels. The demand for fishing craft in Ireland is said to be unprecedented and some 100 applications for vessels were before the Board for consideration in early 1966. (United States Embassy, Dublin, February 25, 1966.)



Ivory Coast

DEVELOPMENTS IN TUNA FISHERIES:

There are two recent developments of interest in the tuna fisheries of the Ivory Coast.

Although the invitation to bid for the proposed 3,000-ton capacity freezing plant was withdrawn in the summer of 1965, a new proposal was then issued for a freezer of the same capacity plus a tuna-canning plant having a capacity of 50 metric tons of raw fish per day, both plants being incorporated in one project. The new bids had been received (2 from U. S. companies and 2 from French firms), and announcement of the bid award was expected. It is expected that this cannery is to be constructed to the most modern and efficient plans, and that the canned tuna to be produced will be competitive on the world market both as to quality and price.

The Abidjan laboratory of ORSTOM (Office de la Recherche Scientifique et Technique Outre-Mer) is acting as the center for a program of tuna research (for the present devoted mostly to fishing effort and catch statistics) participated in by the ORSTOM laboratories in Dakar and Pointe Noire. While the Pointe Noire program is now in its third year, Dakar commenced its work in November 1965 and Abidjan started its program on January 1, 1966. Future work in tuna research will depend largely on ORSTOM staffing during the next several years. (Fish-

eries Attache, United States Embassy, Abidjan, February 3, 1966.)



Japan

TUNA PRICES DECLINE:

Beginning in late March 1966, frozen tuna export and ex-vessel prices began to decline. The f.o.b. price of frozen round albacore, which reached a high of about US\$535 per short ton around March 24, had subsequently declined by as much as \$20 a ton for vessel-frozen products. The ex-vessel price dropped from 200 yen (\$504 a short ton) to about 185 yen a kilogram (\$467 a short ton). Buy offers (albacore, round, f.o.b. \$525-530; yellowfin, gilled & gutted, f.o.b. \$510-515) from U. S. packers located at Puerto Rico slackened, and prices declined by \$5-10 a ton.

The quality of skipjack caught off Japan was found to be too soft to make a first-rate pack and U. S. packers stopped buying that species after having contracted to purchase about 4,500 short tons. This development, in turn, caused the ex-vessel price of skipjack at Makurazaki, southern Kyushu, to drop to 85 yen a kilogram (\$214 a short ton), from 120 yen a kilogram (US\$302 a short ton). At Yaizu in late March, the ex-vessel price declined by 15-18 yen a kilogram (\$38-45 a short ton), to 103-105 yen a kilogram (US\$260-264 a short ton). (Suisan Tsushin, March 29 and April 1, 1966.)

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EXPORT QUOTAS FOR
FROZEN TUNA, 1966/67:

The Board of Directors of the Japan Frozen Tuna Exporters Association at a meeting on March 4, 1966, adopted the quotas on exports of frozen tuna for the fiscal year 1966 (April 1, 1966, through March 31, 1967).

1. Exports to the United States and Canada from Japan proper--110,000 short tons.
2. Exports to other countries--70,000 metric tons.
3. Tuna loins for export to the United States--9,000 short tons.
4. Exports to overseas bases--48,000 metric tons. (These "exports" are the frozen fish landed at overseas bases by the fishing or transport vessels operating in the area.

Japan (Contd.):

The fish are subsequently "reexported" to Europe, the United States including Puerto Rico, and some may be shipped to Japan proper.)

5. Swordfish exports to the United States--5,500 short tons.

A general meeting of the Association was scheduled for March 17 when the export quotas were expected to be approved.

CANNED TUNA EXPORT PLANS OF TRADING FIRMS:

The Japan Canned Foods Exporters Association, for the purpose of developing export plans for the coming business year, conducted a survey of its 18 member firms handling canned tuna to determine the type and quantity of canned tuna in brine they hoped to purchase for export to the United States. In making the survey, the Association used two export targets, one of 2.8 million cases and the other of 2.5 million cases, and proceeded on the premise that 70 percent of the export target would be allotted to the exporting firms on the basis of merit (past performance record). The survey, the results of which are summarized in the table, indicates that buying by the trading firms would

FROZEN TUNA EXPORTS TO U. S. AND PUERTO RICO, JANUARY 1966:

Japan's exports of frozen tuna to the United States and Puerto Rico increased in January 1966, as compared with December 1965.

Japan's Exports of Frozen Tuna by Species to the United States and Puerto Rico, Jan. 1966 and Dec. 1965				
Species	1966 January		1965 December	
	Qty.	Value	Qty.	Value
	Short Tons	US\$ 1,000	Short Tons	US\$ 1,000
Albacore:				
United States. . .	2,105	815	846	349
Puerto Rico . . .	1,416	528	1,525	515
Total	3,521	1,343	2,371	864
Yellowfin:				
United States. . .	2,535	993	877	325
Puerto Rico . . .	308	93	930	231
Total	2,843	1,086	1,807	556
Big-eyed:				
United States. . .	60	20	-	-
Puerto Rico . . .	92	24	102	25
Total	152	44	102	25
Skipjack:				
United States. . .	117	33	-	-
Puerto Rico . . .	806	132	1,181	173
Total	923	165	1,181	173
Total United States	4,817	1,861	1,723	674
Total Puerto Rico	2,622	777	3,738	944
Grand Total . . .	7,439	2,638	5,461	1,618

Japanese Trading Firms' Canned Tuna in Brine Export Plans for 1966

Can and Case Size	Quantity Firms Hope to Export Based on Targets of				Actual 1965 Exports	
	2.8 Million Cases (Merit Quota: 1,96 Million Cases)		2.5 Million Cases (Merit Quota: 1,75 Million Cases)		(Utilization of Merit Quota)	
	Cases	%	Cases	%	Cases	%
Whitemeat & lightmeat:						
7-oz. 48's	715,754	(36.5)	625,050	(35.7)	782,751	(36.0)
13-oz. 24's	389,603	(19.9)	352,943	(20.1)	478,133	(22.0)
4-lb. 6's	855,903	(43.6)	774,920	(44.2)	900,079	(41.4)
3½-oz. 48's	-	-	-	-	11,777	(0.5)
6½-oz. 48's	-	-	-	-	1,345	(0.1)
Total	1,961,260	(100)	1,752,913	(100)	2,174,085	(100)

be heaviest for the 4-lb. cans (6 cans per case), as in 1965. (Kanzume Nippo, January 22, 1966.)

Note: As of late February 1966, the canned tuna exporters and packers had not yet come to terms on the drafting of a new export agreement for business year 1966. The old agreement expired November 30, 1965, so a provisional agreement was adopted. The exporters were reported holding firm for a 70-percent merit and 30-percent adjustment quota, the packers a 40-percent merit and 60-percent adjustment quota.

Exports to the United States proper tripled in quantity and value. The quantity and value of exports to Puerto Rico dropped. (Fishes Attache, United States Embassy, Tokyo, March 31, 1966.)

EXPORT PRICE OF CANNED TUNA IN BRINE TO UNITED STATES:

Following the trend of several months, the Tokyo Canned Tuna Sales Company announced price rises for March sales of canned tuna in brine to the United States. The price increases varied from 90 cents a case (24 13-oz. cans) for lightmeat tuna to \$1.65

Japan (Contd.):

Export Price (f.o.b. Japan), Japanese Canned Tuna in Brine, March 1966			
Type of Pack	March 1966 Price	Increase over Feb. 1966	Increase over Nov. 1965
	. . . . . (US\$/Case).		
<u>Can & Case Size:</u>			
<u>Whitemeat:</u>			
7-oz. 48's	11.80	1.30	2.90
13-oz. 24's	10.95	1.25	2.75
4-lb. 6's	12.55	1.65	2.75
<u>Lightmeat:</u>			
7-oz. 48's	10.05	1.10	2.90
13-oz. 24's	9.50	0.90	2.85
4-lb. 6's	10.90	1.45	2.45

a case (6 4-lb. cans) for whitemeat tuna. Compared with the price in November 1965, the increases amounted to \$2.65 a case for the lightmeat 13-oz. cans and \$2.75 for the whitemeat 4-lb. pack.

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FROZEN SWORDFISH EXPORT VALIDATIONS TO U. S. AND CANADA, APRIL 1965-JANUARY 1966:

Japan's export validations of frozen broad-bill swordfish (fillets, chunks, and "other" forms) to the United States and Canada in January 1966 totaled 403 short tons valued at US\$307,561. This compared with 433 tons valued at \$290,084 in January 1965 and 422 tons valued at \$300,319 in December 1965.

For the 10 months April 1965-January 1966, export validations of frozen swordfish to the U. S. and Canada totaled 3,939 tons valued at \$2,952,898. As in the previous 9 months, fillets accounted for 64 percent of the total. For the 10 months in the 1964/65 business year, frozen swordfish export validations totaled 3,396 tons, valued at \$2,196,638. (Fisheries Attache, United States Embassy, Tokyo, Mar. 31, 1966.)

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EXPORTS OF FROZEN RAINBOW TROUT, JANUARY 1966:

Japan's Exports of Frozen Rainbow Trout by Country of Destination, January 1966		
Destination by Country	Quantity Short Tons	Value US\$
United States	70	56,045
United Kingdom	18	11,975
Canada	5	3,753
Netherlands	3	1,947
Australia	8	6,000
Other	2	1,950
Total	106	81,670

Japan's exports of frozen rainbow trout in January 1966 dropped in comparison with the exports in the previous month--about 40 percent in quantity and about 40 percent in value. Exports in December 1965 amounted to 181 short tons valued at \$135,787. Substantial decreases occurred in exports to all countries. (Fisheries Attache, United States Embassy, Tokyo, March 31, 1966.)

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EXPORTS OF MARINE PRODUCTS, NOVEMBER 1965:

Japan's exports of marine products in November 1965 consisted principally of fresh and frozen fish valued at over US\$4 million

Japan's Exports of Marine Products, November 1965		
Product	Quantity	Value
	Metric Tons	US\$ 1,000
<u>Fresh & frozen:</u>		
Tuna, skipjack	1,032	156
Tuna, other	5,908	1,841
Marlin	673	556
Sea bream	853	153
Mackerel	139	25
Saury	1,687	450
Salmon	7	11
Other fish	2,503	1,033
Total fresh & frozen	12,802	4,225
<u>Cured:</u>		
Cod	5	5
Boiled and dried	36	17
Shark fins	95	164
Other	26	36
Total cured	162	222
<u>Shellfish, etc., fresh, frozen, dried:</u>		
Scallops	3	22
Oysters	19	22
Shrimp	153	325
Squid	694	167
Octopus (fresh)	104	42
Whale meat	1,516	325
Bull frog	72	131
Other	15	25
Total shellfish, etc.	2,576	1,059
<u>Canned:</u>		
Salmon	2,227	2,989
Tuna, skipjack	1,277	1,044
Tuna, other	1,753	1,644
Mackerel	2,486	919
Saury	201	83
Sardine	118	53
Horse mackerel	658	253
Other fish	1,953	1,864
Crab	399	1,153
Shrimp	8	56
Squid	449	166
Other shellfish	500	467
Total canned	12,029	10,691
<u>Others:</u>		
Seaweed, Kombu	65	36
Seaweed, laver 1/	212	11
Agar agar	20	78
1/1a 1,000 sheets.		

Japan (Contd.):

and canned products valued at over \$10 million. (Fisheries Attache, United States Embassy, Tokyo, March 31, 1966.)

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JAPAN-COMMUNIST CHINA (PRIVATE) FISHERIES AGREEMENT:

Japanese private fishing interests and representatives of Communist China renewed their fisheries agreement for another two years from December 23, 1965. The previous agreement was effective December 23, 1963--also for two years. The new agreement is reported to impose stronger restrictions on Japanese fishing operations in the area covered. Primary differences between the new agreement and the one signed in 1963 are: (1) Provisions to control the size of mesh in trawl nets and the catch of young fish; (2) creation of a special zone in which the number of fishing vessels which may operate is to be limited. The 1963 agreement merely called upon the Japanese "to take appropriate measures to prevent your fishing vessels from forcing Chinese fishing vessels from the said fishing ground" without imposing a specific limitation. Basic provisions of the new agreement are reported to be:

(1) Agreement to be effective for two years from December 23, 1965.

(2) Areas covered by the agreement are the high seas of the Yellow Sea and East China Sea north of 27° N. latitude and east of an approximate north-south line about 50 miles off the Chinese mainland.

(3) Establishment of 6 fishing zones and fishing seasons for each zone.

(4) Regulations governing mesh size; the taking of young fish.

(5) Regulations setting aside an area in the central Yellow Sea limiting the number of vessels which may fish there from October through February.

(6) Establishment of emergency ports of call in each country and providing for emergency assistance to fishing vessels.

(7) Both countries to conduct resource investigations and gear improvement studies and to exchange data.

(8) Both countries to settle fishery disputes and fishing violations in accordance with procedures established.

The joint communique issued by the parties claimed that the agreement made positive contributions in preserving the fish resources of the area, maintaining order in operations, and promoting friendship and co-operation between the people and the fisheries circles of the two countries, between whom diplomatic relations have not been restored. The parties expressed serious concern about and opposition to the "Japan-Republic of Korea Treaty" which "normalized" relations between Japan and South Korea. (Fisheries Attache, United States Embassy, Tokyo, April 5, 1966.)

Note: See Commercial Fisheries Review, January 1964, p. 61.

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SOUTH GEORGIA ISLAND WHALING OPERATION TO CEASE:

One of Japan's leading fishery firms has decided to give up whaling operations centering on use of South Georgia Island beginning with the next whaling season (autumn-spring 1966). The base has been used for three years. The firm has made its decision known to the British firm whose base it has leased. This Japanese company and two other Japanese whaling companies several years ago began



Fig. 1 - Stripping blubber from whale at Japanese land whaling station, Leith Harbour, South Georgia Island.



Fig. 2 - Portions of whale blubber awaiting processing at shore base at Leith Harbour, South Georgia Island.

Japan (Contd.):

hunting whales in the South Atlantic, using South Georgia Island as a base, for offsetting a reduction of Antarctic whaling quotas.

However, all of the whaling companies had been incurring a deficit for these operations owing to the smallness of their catches and the high fees they had to pay for renting bases. This led two of the companies to suspend further whaling operations in the season which began in the fall of 1964.

The third company had continued operations as its four-year base contract ran to 1966. The company decided to end the contract, moreover, as such base whaling might adversely affect Japan's future Antarctic whale quota. (Japan Economic Journal, April 5, 1966).

**Mauritania****FISHERIES DEVELOPMENTS:**

"Mauritania Intends to Establish a National Fishing Industry," was the title of an article in the March 19, 1966, issue of the French-language newspaper Marches Tropicaux. Among the items covered in the article are the following:

(1) Six 112-foot stern trawlers have been ordered, to be built in France. The vessels will be refrigerated.

(2) The Government of Mauritania intends to enforce its 12-mile fishing limit. To be able to obtain enforcement vessels, financial assistance is expected from France.

(3) The Government plans to enter into bilateral agreements with other countries giving those foreign nationals the right to fish in the 6- to 12-mile zone provided that some or all of the catch is processed ashore in Mauritania.

(4) It is planned to establish a mixed private industry-government fisheries corporation in Mauritania.

(5) Plans are being made to build, at some future time, a fish meal plant in Mauritania with an annual capacity of 50,000 metric tons of raw fish to produce about 10,000 tons of meal. (Regional Fisheries Attache, United States Embassy, Abidjan, Ivory Coast, April 19, 1966.)

Note: See Commercial Fisheries Review, May 1966 p. 59.

**Mexico****SHRIMP FISHERY OF CIUDAD DEL CARMEN:**

Ciudad del Carmen in the State of Campeche is the leading shrimp port of Mexico's Gulf Coast. The entire economy of this city of 25,000 people is geared to the shrimp industry.

Shrimping started in the 1940's when fishermen and distributors from the United States Gulf Coast expanded their operations with Carmen as an advance base. At first, the fresh shrimp were flown to packing plants in the United States, but soon freezing plants were built in Carmen and all the shrimp were shipped frozen.

The profits were great, and before long Mexican investors began building vessels and freezing plants, until the industry is now nearly all Mexican, including the entire fleet, and only one plant is partly American-owned. For many years Carmen rode a boom, but eventually the catches leveled off and increasing costs narrowed the profit margin.



Shrimp fishing vessels at the dock in Mazatlan (on west coast of Mexico), the leading shrimp port. Ciudad del Carmen in 1964 was in second place.

Until the rapid rise of the Pacific Coast fishery in the late 1950's, Carmen was the leading shrimp port of Mexico. By 1963, Carmen was in third place, behind the West Coast ports of Mazatlan and Guaymas. In 1964, Carmen landings rose to a record high of 11,811 metric tons (live weight equivalent), up from 1963's total of 10,289. This increase, coupled with a slump in Guaymas, moved Carmen into second place behind Mazatlan. Although 1965 figures are not available, it is believed that Ciudad del Carmen held its position.

Ciudad del Carmen, an old colonial city, is located in a beautiful tropical setting on

Mexico (Contd.):

the island of the same name. All highway travel has to cross to the island by ferry. The island, along with two peninsulas, forms a very large lagoon known variously as Laguna de Terminos or Laguna del Carmen. The lagoon is one of the finest nursery areas for shrimp in Mexico and no shrimping is conducted in inside waters. A fleet of canoes and small launches fishes for finfish in the lagoon, but this fishery for the local market is relatively unimportant. Of all Mexico's shrimp ports, none is closer to complete concentration on shrimp alone than Carmen.

Ciudad del Carmen is home port to a fleet of 252 shrimp trawlers. Some of these range afar and occasionally land their catches at other ports, and vessels from other places also sometimes land their catches at Carmen. The vessels stay at sea up to 12 days, although some of the smaller ones are limited to trips of 6 or 8 days. All use ice to preserve their catches. Although manned by members of fishermen's cooperatives, most of the vessels are owned by private individuals or by the plants for which they fish. For example, all 35 vessels fishing for one plant are owned by individuals, whereas another plant of similar size owns 17 vessels or about half of the fleet serving it. When catches are temporarily poor, some of the vessels leave Carmen and neighboring ports and fish for freezing plants located on the Nicaraguan-Caribbean coast.

The waterfront along the lagoon shore is lined with an almost unbroken row of shrimp-freezing plants and boatyards serving the fleet. Eight freezers are now in operation. Shrimp at Carmen are smaller than at nearby Campeche, hence much of the production is peeled and deveined or butterfly shrimp individually quick frozen, which permits better use of the predominant medium sizes. About 80 percent of all production is of this type. Only the largest sizes are shipped as heads-off, shell-on. The small sizes are shipped to the Mexico City market, mostly peeled and cooked. All export shipments are made by refrigerated truck.

All of the approximately 8 small boatyards in Carmen are kept busy with maintenance work on the shrimp fleet. In addition, 9 new trawlers are reportedly under construction or being outfitted. In mid-March 1966, every

marine railway was occupied and other boats were awaiting their turn. Also all ship chandlers were busy. In August 1966, vessel owners and fishermen's cooperatives will negotiate new operating contracts and apparently everyone is dreading a possible impasse like the one that tied up the West Coast industry in September 1965. (United States Embassy, Mexico, April 13, 1966.)

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TREND IS TOWARD INCREASED NATIONALIZATION OF FISHERIES:

It appears more and more likely that the trend toward nationalization of Mexico's fisheries will increase. In early 1966, plans were being developed to increase financial support of the Government-controlled fishing installation at the port of Alvarado on the Gulf of Mexico. This action was being considered in spite of public complaints that the Alvarado operation has not been economically sound. A new Government five-year plan was also proposed which indicated even more nationalization of the fisheries, with credit facilities for Federally-operated fishing enterprises, and probable Government influence on prices for fish and fishery products. Cooperatives would also receive more Government financial backing, according to the plan.

The Government is justifying increased nationalization of fisheries on the basis of: (1) Increased foreign exploitation (primarily U. S., Japanese, and Soviet) of fishery resources off the coasts of Mexico; (2) the recent declining condition of the Mexican fishing industry; and (3) the national plan to increase production, domestic consumption, and exports of fishery products substantially within the next five years. (Various sources.)



Morocco

SHRIMP SHORTAGE IN TANGIER:

A shortage of shrimp in Tangier was reported by the local press in early April 1966. Shrimp was becoming increasingly scarce in the city and what was available was selling for US\$2 to \$3 a pound whereas shrimp had never before sold in Tangier for more than 50 cents a pound. Part of the shortage was reported to be due to exports to France and Spain of most of the locally-caught shrimp.

Morocco (Contd.):

(United States Consulate, Tangier, April 15, 1966.)

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SARDINE FLEET RECOVERS FROM STORM DAMAGE:

The Safi fishing fleet, damaged by a severe storm which lashed the Moroccan coast the night of February 20-21, 1966, was being rapidly repaired and the losses did not appear to be as grave as initially feared. The prompt action by the Government and the vessel owners to refloat and repair the vessels was successful. About 75 vessels of the 125-boat sardine fleet were ready to sail by May 1. About 40 of the sardine boats were lost.

The lack of insurance on many of the boats was also not as severe a blow as expected since during the off-season many of the boats were stripped of nets, radios, and other equipment. (United States Embassy, Rabat, March 23, 1966.)

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TANGIER SARDINE AND TUNA CANNING SEASON:

Early in April 1966, the major fish cannery in Tangier was making preparations to begin its third season of tuna canning. The company's giant madrague nets (large beach seines) were being placed in position, and canning operations were expected to begin in late April.

Local industry officials were pessimistic as to the future of canning and fishing in Morocco. The company will export more fresh fish (sardines) this year, rather than can. The company points out that it can obtain nearly double the price for the fresh fish it exports than that received for the canned product, and this helps to cut increasing operating costs which eat into profits. The company has also experienced the effect of recent credit restrictions. At the beginning of each season the company must make considerable financial outlays to purchase packing oil, salt, and the cans necessary in canning operations. Without bank credits, the company is hard put to make these necessary purchases.

The Tangier fishing fleet from 35 vessels has been reduced to 7 in service and will soon

number only 5 as actively engaged in fishing on a commercial scale. Several reasons were given for this situation. First, the Moroccan Government has prohibited the fishing vessels from calling at nearby Spanish Ceuta. Moroccan fishing boats had previously sold their catches in Ceuta at nearly double the Tangier prices; they could also buy fuel and make repairs in Ceuta at less expense than in Morocco. Added to this was the fact that the bottom has literally fallen out of the fish market in Tangier. Fish prices in Tangier have been extremely low all winter and are the lowest in Morocco. This price problem is made worse by the local regulation making it difficult for the local fishermen to move their catch out of Tangier to other domestic markets. Tangier fishermen are also disappointed over the failure of the national Government to construct the long-promised central fish market. It was also reported that marine credits have not been forthcoming to enable repairs on the fishing vessels and engines. This reportedly results from the fact that the present Tangier fish mart is not integrated under the law which applies to other Moroccan ports whereby the Government can withhold the proceeds from the sales of fish to repay loans granted to fishermen from the banks. Finally, the members of the fishermen's union are continually demanding increased wages. They recently struck for a wage hike ten days before the madragues were scheduled to be set.

Given the factors enumerated above, it was considered that this year will prove to be a difficult one for the Moroccan fishing and canning industry. The local sardine cannery had received no orders for canned sardines and the sardine cannery would therefore be unprepared if orders finally materialize. This was due to the inflated price of canned sardines stemming from the OCE nationalization of canned fish exports. It was also noted that there was almost a complete absence of shrimp in the northern waters. The opinion was expressed that there was a great deal which the local and national governments could do to help ease the situation, but nothing was being done.

After the recent destruction of many fishing vessels at Safi because of a violent storm, Tangier fishermen had been hopeful that the Safi interests would come to Tangier to purchase the idle boats with insurance money received for their sunken craft. However, the Government insurance has required that the

Morocco (Contd.):

damaged and sunken craft be first repaired before any insurance money would be paid, even if this entailed an outlay of additional funds on the part of the vessel's owner above the value for which it had been insured. Thus the prospect of sales of the idle craft seems dim. (United States Consulate, Tangier, April 8, 1966.)

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NEW FISH COMPLEX PLANNED:

A fish-processing complex may be built at Al Hoceima on the central Mediterranean coast of Morocco, according to the Moroccan press. Included will be an ice and cold-storage plant and a cannery. The cold-storage plant will store fish to be processed in the cannery during the off-season for fishing. (United States Consulate, Tangier, April 15, 1966.)

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AGAR-AGAR PLANT
TO MOVE FROM TANGIER:

The director of the company in Tangier which produces agar-agar, reported that his company decided to transfer their plant from Tangier to El Jadida. The decision to move was made by the company's head office in Italy, primarily to reduce operating costs by relocating the plant at the source of its seaweed raw material, which is near El Jadida. The company produces about 120 metric tons of agar-agar annually, 30 percent of which is exported to the United States. The relocation of the plant at El Jadida will have the additional advantage of being close to Casablanca from where all the company's shipments to the United States are made. The company encountered considerable difficulty in making shipments directly from Tangier to the United States. It was unable to find regularly scheduled ships going to the United States from Tangier and, therefore, sent its shipments to the United States via Casablanca, which entailed additional transportation costs. The move was scheduled to begin the end of July 1966 and requires about five months to be completed. Of the staff of 45 employees, only about 12 will move with the plant to El Jadida. (United States Consulate, Tangier, April 6, 1966.)

**Mozambique**FISHERIES PRODUCTION, 1961-1965:

At the end of 1962, the Mozambique fishing industry employed 13,717 fishermen who used 4,128 oar or sail boats and 92 motor-

Fisheries Production, 1961-1965					
Species	1/1965	1964	1963	2/1962	2/1961
	(Metric Tons)				
Fish, unspecified . . .	3,319	3,508	2,545	-	-
Clams	196	164	158	-	-
Shrimp	386	262	383	-	-
Shellfish, other (including spiny lobster and crab)	257	418	284	-	-
Total	4,158	4,352	3,370	3,257	3,285
1/For January through September only. Estimated total for the year, 4,425 metric tons.					
2/Species breakdown not available.					

driven craft. Since 1962, there has been an increased interest in the fishing industry. One company remains dominant in the industry. This company displayed a variety of fishery products for export, including canned and otherwise preserved shellfish, at a trade and industrial fair in Lourenco Marques during July-August 1965.



Typical fishing craft operating out of Lourenco Marques, Mozambique.

In 1965, a spiny lobster fishing and export company, with two United States shareholders, declared its voluntary bankruptcy. For several years, this company was Mozambique's only lobster tail processing and export company, with an assured distribution in the United States. (United States Consulate, Lourenco Marques, March 28, 1966.)

**Netherlands**FISHERY LANDINGS, 1964-1965:

Fishery landings in the Netherlands in 1965 totaled 320,655 metric tons with an ex-

Netherlands (Contd.):

Netherlands Fishery Landings, 1964-1965						
Species	1965			1964		
	Quantity Metric Tons	Value		Quantity Metric Tons	Value	
		Fl. 1,000	US\$1,000		Fl. 1,000	US\$1,000
SALT-WATER FISH:						
Groundfish:						
Haddock	24,291	7,375	2,049	14,892	4,816	1,338
Cod	17,585	11,059	3,072	9,117	6,451	1,792
Saithe	7,767	3,286	913	4,082	2,004	557
Whiting	8,063	2,775	771	5,949	2,701	750
Ling	321	190	53	227	141	39
Hake	35	47	13	45	53	15
Eel	223	999	277	271	992	276
Other groundfish	2,533	1,449	402	1,425	815	226
Total groundfish	60,818	27,180	7,550	36,008	17,973	4,993
Flatfish:						
Plaice	20,738	14,618	4,060	22,233	11,291	3,136
Fluke	490	166	46	510	144	40
Dab	1,204	595	165	949	436	121
Sole	11,592	45,674	12,687	7,463	39,740	11,039
Other flatfish	1,591	4,698	1,305	1,607	4,071	1,131
Total flatfish	35,615	65,751	18,263	32,762	55,682	15,467
Herring:						
Fresh	37,323	16,928	4,702	56,708	16,255	4,515
Salted	34,850	28,307	7,863	47,697	30,088	8,358
Sprat	3,756	773	215	4,856	539	150
Other herring-like fish	1,359	315	87	470	148	41
Total herring & herring-like	77,288	46,323	12,867	109,731	47,030	13,064
Mackerel	17,960	5,294	1,471	17,531	5,421	1,506
Miscellaneous salt-water fish ^{1/}	4,294	676	188	2,888	390	108
FRESH-WATER FISH:						
Eel	2,275	9,200	2,555	1,984	7,127	1,980
Other fresh-water fish ^{2/}	10,647	1,298	361	9,396	1,239	344
Total fresh-water fish	12,922	10,498	2,916	11,380	8,366	2,324
SHELLFISH:						
Oyster	716	4,586	1,274	557	3,436	955
Mussels	96,084	11,444	3,179	100,714	12,009	3,336
Shrimp	8,047	17,289	4,802	8,886	11,327	3,146
Other shellfish ^{3/}	6,911	480	133	9,210	501	139
Total shellfish	111,758	33,799	9,388	119,367	27,273	7,576
Grand Total	320,655	189,521	52,643	329,667	162,135	45,038

1/Mostly immature fish.

2/Mostly whitebait.

3/Mostly immature shrimp.

Source: Netherlands Central Bureau of Statistics.

vessel value of fl. 189.5 million (US\$52.6 million). Compared with the previous year, that was a drop of 3 percent in quantity, but a gain of 17 percent in value.

The decline in quantity was due to a drop in herring landings. The decline was almost offset by increased landings of haddock, cod, other groundfish, and sole. The increase in value was due to higher prices for shrimp and herring as well as the heavier landings of groundfish and flatfish.



Nigeria

NEW SHRIMP FISHING ENTERPRISE FORMED:

On February 24, in Enugu, representatives of the Government of Eastern Nigeria and a

group of American investors signed agreements establishing a joint shrimp-fishing company. The American group, with 75 percent of the equity capital, will have a controlling interest in the firm.

The new enterprise, registered as Sea Harvest Nigeria Ltd. (SHN), will operate a fleet of trawlers (initially 13 in number) in the Bights of Benin and Biafra, under the direction of an American citizen with long experience in shrimp fishing in the Gulf of Mexico. The shrimp catch, expected to be about three million pounds a year at the start, will be frozen and packaged at a Port Harcourt plant for export to the United States. Other catch is to be marketed locally. Some consideration is being given to the possibility of processing industrial fish into fish meal and fish protein concentrate.

Nigeria (Contd.):

SHN's backers are hopeful that further proving of the still relatively virgin Nigerian shrimp-fishing grounds will justify rapid expansion of the company's fleet. (United States Consulate, Enugu, March 25, 1966.)

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FROZEN FISH MARKETING AND DISTRIBUTION:

Four fishing companies in Lagos land and distribute throughout Nigeria 4,000 to 5,000 metric tons of frozen fish each month.

Three of the companies, corporately inter-related and in part owned by the Nigerian Government and Liberian-Danish-Greek interests, handle about 30 percent of the frozen fish marketed annually in Nigeria. Their fish is obtained entirely from foreign-owned factory trawlers (Japanese and Polish) based in Nigeria but fishing in waters 1,500 to 2,000 miles distant. One of these companies has 300 tons of cold-storage capacity. Another of the companies has 1,500 tons of cold-storage space. Some of the frozen fish is shipped to the northern part of Nigeria in a refrigerated railway car owned by a local Nigerian-American food company which brings beef to Lagos from the north.

The fourth fishing company, owned and operated by a local family, handles 70 percent of the frozen fish landed and distributed in Nigeria. This company owns 3 Japanese trawlers, each 165 feet long, with a 180-ton carrying capacity, and 2 Soviet trawlers of slightly smaller size. The vessels carry a 50-percent Nigerian crew and are based in Nigeria. The company selected Nigerians for these trawlers for the purpose of training and eventually having the vessels completely Nigerian-manned. The company has instituted a program aimed at acquiring men with a minimum of 4 years of secondary education and preferably 6. This endeavor is working out well with a retention of approximately 90 percent to further complete the Nigerianization of operations.

The company has stressed the need for a Federal Fisheries School, and, to this end, a proposal for the formation of such a school has been formulated by the Federal Service.

This company has decided to embark on a shrimp-fishing venture, a decision which was

influenced in a large measure by positive results of reports from the Federal Fisheries Office and of AID-sponsored trawling operations which clearly indicated a shrimp potential. This will consist of three trawlers now being built in Japan, with 51 percent Nigerian interest and 49 percent Japanese. Marketing for these trawlers will be handled by the Japanese for export to Japan. The trawlers will be under 60 feet in length since this is an acceptable size for economical fishing, and, in addition, will comply with existing minimum Nigerian manning regulations. The company feels that this type of vessel can be entirely Nigerian-manned in a shorter length of time. The three vessels will be delivered before the end of 1966.

Another 5 vessels are being constructed by an Austrian firm, the first 2 of which will be delivered about September and the remainder in early 1967. These vessels will be owned outright with a ten-year repayment period. They are 59 feet long and of simple design. It is expected that marketing of the shrimp from these vessels will be done through U. S. buyers.

The company is planning a new shore installation. This will include a processing plant, dock, ice-making facilities and storage. The storage facility as well as a small ice plant are already in operation.

The company feels that the fishing interests of Nigeria can be served best by lending assistance in the field of research and exploratory work on the sea fishery as well as introducing a proper training school. It is believed that the build-up of an indigenous trawler fleet would be impossible without the requisite trained manpower and capital to purchase new boats. The company and others will be in a position to buy the products from such fleets.

The company has fairly extensive cold-storage facilities (at about 13 locations) in Lagos, and the Eastern, Midwestern, and Western Regions of Nigeria. These range in size from 40 to 50 tons capacity to about 3,000 tons. The company plans to continue expansion and ultimately hopes to increase monthly fish hauls from the present 3,000 to 12,000 metric tons a month. (United States Embassy, Lagos, March 31, 1966.)



Norway

HERRING AND COD FISHERY TRENDS, MARCH 19, 1966:

Herring: As of March 19, the 1966 Norwegian herring catch amounted to 4.86 million hectoliters (452,000 metric tons) and the capelin catch amounted to about 863,000 hectoliters (80,260 tons). That was about double the catch of herring and capelin during the same period of 1965. Fish meal and oil plants absorbed all of the 1966 capelin catch and 80 percent of the herring catch.

Cod: The Norwegian catch of spawning and Finmark cod as of March 19, 1966, totaled 42,183 tons of which 11,077 tons went for filleting, 10,038 tons for drying, 16,230 tons for salting, and 4,838 tons for fresh consumption. The 1966 cod fishery off northern Norway has been somewhat more productive than in the past two years when catches were very light. (Fiskets Gang, March 24, 1966.)

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BAN ON FOREIGN FISHERY LANDINGS MAY BE RELAXED:

The Norwegian Government plans to ask Parliamentary approval of a new landings law. While retaining a general ban on foreign landings, the new bill would allow the issuance of special landing permits for foreign-caught fish provided such landings do not disrupt prices and other marketing conditions in the domestic or export markets for Norwegian fish. Foreign landings would also be permitted when necessary to implement international agreements, and in cases of vessels in distress. A shortage of fish, especially groundfish, for processing is the reason for the new proposal. (United States Embassy, Oslo, April 10, 1966.)

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WHALING FACTORYSHIP MAY BE SHIFTED TO HERRING FISHERY:

As of early March 1966, Norway's two Antarctic factoryship fleets--Kosmos IV and Thorshavet--reported very poor whale catches for the Antarctic season. On March 8, 1966, the operators of Kosmos IV announced that the vessel would probably be withdrawn from pelagic whaling after the present season for use as a factory-freezer vessel in the Norwegian coastal herring fishery. This is another move in the gradual liquidation and conversion of Norwegian whaling vessels.



Pakistan

12-MILE FISHING LIMITS DECLARED WITH RIGHTS TO EXTENDED "CONSERVATION ZONES":

On February 19, 1966, the President of Pakistan proclaimed exclusive fishing rights for Pakistan within a distance of 12 nautical miles from the coastline.

In the Proclamation, Pakistan also claimed the right to establish conservation zones to a distance of 100 nautical miles from the outer limits of territorial waters, and to regulate fisheries in the zones so established, subject to the provisions of any international agreement or convention to which Pakistan is or may become a party. (United States Embassy, Rawalpindi, February 23, 1966.)



Panama

INTEREST IN DEVELOPING THE FISH MEAL INDUSTRY INCREASES:

In early April 1966, at least 6 new potential investors (4 Panamanian, 2 American) were known to be investigating the feasibility of establishing fish-meal enterprises in Panama. One investor had established a company and was negotiating for the purchase of a fish meal plant, probably from Peru.

Suppliers of fish-meal equipment, nets, marine hardware, and similar items may wish to investigate sales of those items in the Republic of Panama. Initial inquiries could be directed to the U. S. Embassy in Panama. The importation of fishing vessels into Panama generally is prohibited and vessels used in the domestic industry normally must be constructed in Panama.

All of the four proposed new plants on which there is definite knowledge are to be built on the Bay of Panama, near Panama City on the Pacific side of the Isthmus. It is assumed that any additional plants constructed in Panama also would be located on the Bay of Panama, the primary fishing area in the Republic for anchoveta and thread herring, the raw material for the industry.

One group was known to be interested in the possible construction in Panama of large fishing vessels for the express purpose of fishing for anchoveta and thread herring.

Panama (Contd.):

The remaining groups hoped to convert local shrimp vessels to supply their fleet needs.

The Director of Panama's Bureau of Fisheries expressed concern that Panama may face a too rapid development of its fish-meal industry. He stated that no definitive information is available concerning the anchoveta and thread herring population in Panamanian coastal waters. He advised that he has counseled potential investors to limit the size of their initial plants pending the development of more precise information concerning the extent to which Panamanian waters can support this new local industry. According to the same official, the Government currently has no plans to limit the number of licenses issued for the construction of fish-meal plants since Panamanian law requires that all potential new investors in the industry must be treated in the same fashion as previous applicants for licenses. However, should it appear the industry is growing too rapidly, steps undoubtedly would be taken to restrict fishing or plant construction with a view to exercising some degree of fish conservation. The fear also has been expressed that the new industry might result in a major diversion of vessels away from local shrimp fisheries. (United States Embassy, Panama, April 7, 1966.)

SHRIMP CATCH AND EXPORTS, 1965:

In 1965, Panama's shrimp catch totaled 12,900,275 pounds and was divided by species as follows: white--4,990,911 pounds; pink--2,841,073 pounds; "titi"--4,161,672 pounds; tiger--831,472 pounds; and "solenoceras"--75,206 pounds. The value of the catch was not given. Good catches of white and pink, the preferred species, brought high prices and offset the fact that the total shrimp catch was below the 1964 level of 15,500,000 pounds. Panamanian shrimp imports were valued at \$600,000 in November 1965, and \$630,000 in December 1965. (United States Embassy, Panama, March 23, 1966.)



Peru

FISH MEAL AND OIL SITUATION, MARCH 1966:

Peruvian anchovy landings for October 1, 1965-February 28, 1966, were estimated at

5.5 million metric tons, only 1.5 million tons short of the quota-limit established by the Government for the current season (October 1, 1965-June 30, 1966). The quota-limit was expected to be reached by late April or early May. Plant owners want the Government to increase the catch quota and reduce the length of the closed season (July through September 1966). The fishermen are also concerned over the prospects of being four or more months out of work.

Fish meal production remained at high levels during the early months of 1966: January--242,380 metric tons; February--179,330 tons; March 1 to 15--90,000 tons (estimated). The anchovy resource situation over the long term, however, is still doubtful because of the large proportion (60 percent) of immature fish being taken which was resulting in considerably less oil production than would otherwise be obtained from adult fish. Anchovy catches in early 1966 were estimated as follows: January--1,740,000 metric tons; February--1,830,000 tons; March 1 to March 15--970,000 tons. (United States Embassy, Lima, March 30, 1966.)



Poland

FISHERY AID TO SYRIA:

In December 1962, Poland and the Syrian Arab Republic signed an agreement for economic cooperation which was enlarged by a supplementary protocol in June 1965. The protocol provides for the exportation to Syria of Polish fishing vessels, as well as for their maintenance (presumably by Polish technicians).



Portugal

CANNED FISH EXPORTS, 1965:

Portugal's total exports of canned fish in oil or sauce during 1965 were up 18 percent from 1964, due mainly to larger shipments of sardines and mackerel. Sardines accounted for 75 percent of the total canned fish exports in 1965.

Portugal's principal canned fish buyers during 1965 were Germany with 18,758 metric tons, Italy 13,866 tons, the United Kingdom 8,417 tons, France 5,535 tons, the United

Portugal (Contd.):

Portuguese Canned Fish Exports, 1964-65				
Product	1965		1964	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	61,383	3,230	55,272	2,909
Chinchards	2,667	140	3,305	174
Mackerel	10,310	412	5,349	214
Tuna & tunalike	3,456	115	2,097	70
Anchovy fillets	3,654	365	3,247	325
Others	794	42	665	35
Total	82,264	4,304	69,935	3,727

States 6,372 tons, and Belgium-Luxembourg 5,432 tons. Italy's purchases of canned fish from Portugal in 1965 were up 70 percent from 1964, and purchases by Germany were up 34 percent. (Conservas de Peixe, February 1966.)

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CANNED FISH PACK, 1965:

The Portuguese total pack of canned fish in oil or sauce in 1965 was about the same as in 1964. A decline in the important sardine pack was offset by a sharp gain in the mack-

Portuguese Canned Fish Pack, 1964-65				
Product	1965		1964	
	Metric Tons	1,000 Cases	Metric Tons	1,000 Cases
In oil or sauce:				
Sardines	56,147	2,955	70,209	3,695
Chinchards	2,330	122	1,542	81
Mackerel	13,055	522	4,211	169
Tuna & tunalike	7,253	242	5,931	196
Anchovy fillets	4,232	422	3,002	300
Others	1,838	96	737	39
Total	84,855	4,359	85,632	4,480

erel pack and some increase in the pack of tuna, chinchards, and anchovy fillets. (Conservas de Peixe, February 1966.)

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MODERN VESSEL JOINS COD FLEET:

In early April 1966, the Cidade de Aveiro, a modern cod vessel valued at US\$1.75 million was launched in Portugal. It is the only vessel in the Portuguese cod fleet to be propelled by an electric diesel engine. The vessel will fish off the coasts of Greenland and Labrador and will have a storage capacity of 1,300 metric tons of salted and frozen fish.

At the launching ceremony, the Portuguese Minister of Marine noted that the Cidade de Aveiro was one of three new cod vessels (the other two will be ready in July and October 1966) envisaged under the Intercalary Devel-

opment Plan to bring the supply of cod in line with demand. He added that 35 Portuguese fishing vessels with a total value of 541,500 contos (US\$18,952,500) were either under construction or would be by the end of 1966.

An increase in the cod catch will be welcome in Portugal where dried cod (bacalhau) is a favorite dish. Last year, over 5,000 tons of cod had to be imported to supplement local production. (United States Embassy, Lisbon, April 12, 1966.)



South Africa

PELAGIC SHOAL FISH CATCH UP IN 1965:

The combined shoal fish catch for South and South-West Africa was 1,261,710 short tons in 1965, compared with 1,194,635 tons in 1964.

A significant rise in the anchovy catch contributed to the record total shoal fish catch made by the South African industry in 1965. The South African anchovy catch rose from 104,630 metric tons in 1964 to 194,673 tons in 1965 and the total pelagic catch rose from 471,578 tons to 526,777 tons.

On the other hand, the South African pilchard catch fell from 282,301 tons in 1964 to 224,890 tons in 1965. Included in the total of 526,777 tons are 63,374 tons of maasbanker and 43,840 tons of mackerel.

The pilchard catch in South-West Africa reached 734,299 tons in 1965, compared with 723,057 tons in 1964; and the 634 tons of anchovy which were also caught brought the shoal total for the year to 734,933 tons.

The fish meal processed from the shoal fish catch totaled 124,122 tons in South Africa and 175,964 tons in South-West Africa, a total for 1965 of 300,086 tons. The comparable figure for 1964 was 283,989 tons.

The December catches which contributed to the 1965 totals were: In South Africa, 1,215 tons of pilchards, 1,036 tons of anchovy, and 2,344 tons of maasbanker.

According to the Division of Sea Fisheries, during December no pilchards were canned in South Africa, but a total of 410,280 pounds of maasbanker were canned. The total prod-

South Africa (Contd.):

uction of fish body oil in South Africa during the month was 33,613 imperial gallons.

The total production of fish body oil in South Africa reached 4,863,605 imperial gallons during 1965. During the year, 2,905,992 pounds of pilchards were canned in South Africa together with 10,097,328 pounds of maasbanker and 9,865,680 pounds of mackerel, making a total of 22,869,000 pounds. (South African Shipping News and Fishing Industry Review, February 1966.)



South Africa Republic

HAKE FINDS GOOD MARKET IN GREAT BRITAIN:

Cape hake which South Africans had no part in catching was in the news in January 1966 in the port of Fleetwood on the north-west coast of England. One of the four major centers of the British trawling industry, Fleetwood was hard hit when many trawler crews would not go to sea in the Christmas-New Year holiday period.

As a result, in early January landings fell sharply and fresh northern hake was one of the species in short supply. The price rose to a high of about US\$93.00 a 140-lb. box (61 cents a lb.) wholesale and merchants turned to supplies of frozen hake available at about a third of that price.

The frozen fish was hake caught off South Africa by Japanese fishing vessels.

As supplies of fresh hake picked up, the demand for the frozen product fell off again. The British consumer, however, was reported becoming accustomed to this import from South Africa and difficulties in finding the northern hake point to a steady increase in demand from the United Kingdom.

But great care has to go into the preparation of fish exports to this highly discriminating market. The right quality will only be obtained when the South African hake is frozen aboard soon after it is caught. Chilled fish taken by Cape Town trawlers, landed in ice and then frozen is not the product expected to find increasing acceptance in Britain in the future.

British trawler owners may decide to join the foreign fleet fishing off Southern Africa. This year the number of freezer stern trawlers operating mainly out of Hull and Grimsby will be nearly doubled. Those vessels, ranging in size from 700 to 1,700 gross tons, are at sea for periods of 40 to 50 days and bring in catches of 400 and 500 metric tons.

In the designs of several of them there is provision for their transfer to far distant waters and the presence in South Africa of representatives of the White Fish Authority and of the Torry Research Station is an indication of British interest in that area. (South African Shipping News and Fishing Industry Review, February 1966.)

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RECORD WHALING SEASON IN 1965:

The South African 1965 offshore whaling season was a record one, according to the annual report of one South African whaling company. The highest production was achieved since the company discontinued its Antarctic whaling operations--a record for the value of production during the season and the greatest number of whales ever taken in one season.

The Chairman announced that for the first time, in the 1966 season, a restricted catch would be applied to the company's offshore whaling.

This development results from a meeting of the International Whaling Commission in London in June 1965 when a recommendation from a special meeting held in May was adopted restricting the catch of baleen whales by land-based stations.

The Commission recommended that the Governments concerned should restrict baleen whaling operations from land stations in the Southern Hemisphere during 1966 on a voluntary basis as an interim measure. The recommendation was later accepted by the South African Government.

The company's report revealed that this decision would reduce the 1966 catch of baleen whales to 90 percent of the previous year's catch. This would mean that about 750 baleen whales could be taken, compared with 826 last year.

Baleen whales formed about one-third of the total season's catch.

South Africa Republic (Contd.):

Reviewing the 1965 season, the Chairman said that the weather in the latter part had been most favorable, as had been the case for the past few years. Of the 234 days of the season, 66 were lost when ships were weather-bound, compared with 76 "lost" days out of a total of 236 in the 1964 season.

There had been no significant reduction in the average size of whales taken. It was difficult to draw any definite conclusion whether the general increase in the number of whales taken had resulted from greater catching effort or from more favorable weather. A third possibility was that this might be an indication that the stock of whales on which the company was drawing was not being overtaxed.

Of the coming season, he said that last year he had referred to the company's intention of making provision for processing the whole of the crude sperm oil production. It has been decided to defer this action for the time being.

This was partly on account of the substantial increase in the production of crude sperm oil and partly because the plant in use was apparently capable of meeting the existing demand for processed sperm oil. As a result, the company would continue to market a portion of its sperm oil production as crude sperm oil.

In the 1965 season, the price for crude sperm oil was substantially the same as for the previous season, but the company had sold forward some of its expected 1966 production at somewhat higher prices.



Fin whale being transported to plant in Durban, South Africa.

Last season there were 12 catchers operating, 2 more than in the previous season, and of those, 4 were fitted with ASDIC equip-

ment. While the additional craft increased operational costs, they had also contributed to the increased catch.

As in the past few seasons, two spotter aircraft had been employed to assist in locating and tracking whales, and to report back to the catchers.

The company's products were sold in 16 foreign countries including Chile, Mexico, Switzerland, Zambia, and Colombia.

A breakdown of the season's total catch shows that of the 3,640 whales, there were 826 baleen whales (6 blue whales, 361 fin, and 459 sei whales). The balance of 2,814 was sperm whales.

The 1966 season opened on February 1 when five catchers went into commission in search of sperm whales, which are the only type which can be taken in the early stages of the season. As conditions improved and whales became more plentiful, the number of catchers were increased to 12--the same as last year. (The South African Shipping News and Fishing Industry Review, February 1966.)



South-West Africa

BOAT OWNERS REQUEST INCREASE IN PILCHARD PRICE:

The Walvis Bay Fishing Boat Owners Association requested a price increase from about US\$12.38 a metric ton to about \$14.06 for pilchards delivered to the 7 Walvis Bay fish factories. As of March 18, 1966, the factory owners had not yet replied. The boat owners requested the increase on the following grounds:

The world price for fish meal has doubled since the price of raw fish was last fixed and it is felt that a fair share of the product profits should be passed on to the primary producer. The cost of replacing vessels has doubled since the last increase was granted. The cost of maintenance has doubled since the last increase was granted. The cost-of-living generally has increased substantially since the last increase was granted. (Namib Times, Walvis Bay, March 18, 1966.)



Spain

SIGNALS USED BY PAIR TRAWLERS IN NORTHWEST ATLANTIC:

Spanish pair trawlers began fishing off New England in the vicinity of Georges Bank, in the spring of 1966.

Following is the text of Spanish regulations governing signals to be used by Spanish pair trawlers operating in the Atlantic Ocean off the northeastern coast of the United States:

(1) Vessels engaged in trawling in pairs must, upon the approach of another vessel, in order to keep the latter from passing between the two vessels forming the pair, display a torch or flare alongside the net, in addition to other required signals.

(2) In the daytime, for the same purpose, two black spheres or bodies, 0.61 meter (2 feet) in diameter, shall be raised vertically at least 1.20 meters (3.9 feet) apart, with a pennant above them.

(3) The two vessels forming the pair shall display the signals by day and by night.



Taiwan

FISHERIES DEVELOPMENT TRENDS:

Taiwan's fishing industry has been developing rapidly and today ranks second only to Japan in Southeast Asia. During the annual convention of the China Fisheries Association in Taipei (December 12, 1965), K. T. Li, the Minister of Economic Affairs, in a speech regarding the further development in the fisheries of Taiwan said, in part:

The first problem I would like to bring up concerns the potential for future fisheries development. Fishing activities have shown a gradual decline due to the shortage of labor in such industrialized countries as the United States, Great Britain, Japan, and West Germany. This offers a golden opportunity for the developing countries having low-cost and abundant labor to fill the gap. We are in a position to take advantage of it:

(1) In respect to manpower, we are blessed with a large supply of industrious and intelligent labor.

(2) Among sources of funds available for fisheries development, can be the idle local capital. Through proper arrangements and guidance, it can be directed toward investment in fisheries. Foreign financial assistance in the form of equity or loan capital can also be obtained. Already several American fish canneries have expressed their willingness to extend loans for

boat construction in Taiwan. Another significant source of funds is the World Bank, whose loans may continue to be available as long as we can set up bankable projects.



(3) The United States and several European countries have large and ever-increasing demand for import of fish products. Japan, the largest fish-producing country in the world until 1964, used to export nearly US\$300 million of fish annually, but its exports have been falling and imports rising since three years ago with yearly imports of fish products exceeding US\$60 million in 1964. At present, frozen tuna and shrimp constitute the bulk of our fish exports. I hope that fish canning will be developed and foreign markets for canned fish further explored. For example, we can step up our efforts for the export of canned sardines to the Philippines, to take advantage of the fact that the products of the Union of South Africa are in disfavor in the world markets because of racial discrimination. In this connection, it is significant to note that manufacture of aluminum cans on a large commercial scale is now practicable as a result of the joint development effort of the Taiwan Fisheries Research Institute and the Taiwan Aluminum Corporation. Future efforts in fisheries development should be directed toward (a) promotion of export; (b) development of deep-sea fisheries; (c) mechanization and modernization of production facilities; (d) development of processing; and (e) development of shrimp culture.

At the present stage, a great deal of emphasis is being placed on the development of deep-sea tuna fishing, which undoubtedly warrants further encouragement in view of the increasing demand for frozen tuna in the world market and decreasing supply of this product by Japan. Our position as a tuna-producing country has now been considerably strengthened following the expansion of our tuna fleet with vessels constructed with

Taiwan (Contd.):

a World Bank loan and the success of the overseas base operation at American Samoa.



Fig. 2 - Type of modern tuna long-liner now used by Taiwan fishermen. This one was launched in 1965.

Shrimp fishing is also promising. The export as well as production of shrimp has steadily increased in recent years.

The development of large-stern trawler fishing has been a matter of discussion for many years; it has developed very quickly in Japan and other advanced countries, and seems to be a fairly profitable undertaking.



Fig. 3 - Tuna displayed for auction at Taiwan's Kaohsiung market.

Japan exports various kinds of fishery products besides frozen and canned tuna, including canned salmon, canned crab, pearls, etc.; it occurs to me that it may be timely for us to initiate studies on the feasibility of going into these various export fields.

Deep-sea fishing is beyond the capacity of family-type small operators. We have a few relatively large fishing companies, all newly established with World Bank and the Joint Commission on Rural Reconstruction (JCRR) financial assistance. These enterprises are still too small and too few to permit economies possible to large companies.

The motorization of fishing craft and wide use of synthetic lines and nets have been introduced with success in Taiwan. However, electronic equipment, including fish finders, is still not popular in Taiwan. For instance, only a few hundred out of upwards of 8,000 powered fishing boats are equipped with fish finders.

Little work has been done in mechanizing fishing operations.

The average annual catch per fisherman in Taiwan is only 2.4 metric tons, as compared with 64 tons in West Germany. This may be attributed to a number of factors; but inefficient fishing methods and equipment are by far the most important.



Fig. 4 - Purse-seine fishing was introduced in Taiwan only a few years ago. Bonito in net will be brailled out with scoop net (far right).

We should also report two important achievements in the field of fish culture. One is the success in the induced spawning of Chinese carp, the other is the phenomenal 200-300 percent increase in fish yield obtained by the application of chemical fertilizers in freshwater fish ponds. Artificial spawning will save large amounts of foreign exchange spent annually for import of fish fry, while the increase in fish production in freshwater ponds will permit fuller utilization of reservoir ponds.

The oyster growers in Australia enjoy a good income and live well. In contrast, the oysters grown in Taiwan are generally small and unsightly and our oyster farmers poor. A study should be made for improvement of oyster culture so that better harvest can be assured and the living standard of oyster farmers improved.

We frequently hear of complaints by foreign buyers about the quality of our fishery exports. I hope that such



Fig. 5 - Fish market at Makung on Pescadores, Taiwan.

Taiwan (Contd.):

complaints will be kept to a minimum in the future. We must make our producers quality-minded and strengthen our export inspection system. The establishment of a system of self-inspection by the industry should be promoted.

We have up to now done very little for promotion of market news services. This work is extensively conducted by such countries as the United States and Japan, both of which have their own vast networks spreading all over the world. We have to keep close contact with and make effective use of these foreign fish market news services. However, we must have such services of our own some day.

International cooperation is another field to which we should attach great importance. In the last two years, we have sent a number of technicians to South Vietnam, Singapore, Sierra Leone, and Malta to help develop fisheries in those countries. We have made gifts of Chinese carp fry to South Vietnam and the Philippines. We also should seek technical cooperation with countries that are economically advanced but deficient in fish supply such as Australia.

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TO BUY FISHING VESSELS:

The Government of the Republic of China plans to submit an application for a World Bank (IBRD) loan of US\$10.9 million. The loan would finance the construction and gear for 28 fishing vessels (of which 24 would be 150 gross tons and 4 only 15 gross tons). (United States Embassy, Taipei, April 9, 1966.)



Republic of Togo

RECEIVES FISHING VESSEL
FROM WEST GERMANY:

A gift of a fishing vessel (the Berlin) was presented to Togo by West Germany on April 5, 1966. This is one of two vessels to be presented to Togo under an aid agreement of December 1963 between the two countries. The vessel is about 57 feet long, has a beam of about 18 feet, and a draft of about 6 feet. The Government of Togo with the aid of German specialists will use the two vessels for exploratory fishing and fishing gear improvement and development. The vessels will operate out of the new port in Lome being built by German contractors under a West German loan agreement. (United States Embassy, Lome, April 13, 1966.)



Tunisia

FIVE FISHING VESSELS
FROM EAST GERMANY:

The last 5 of 10 fishing vessels ordered from East Germany arrived in Tunisia in March. The first 5 vessels were delivered in January. The vessels were obtained in exchange for Tunisian exports under a trade agreement with East Germany signed in August 1964.

The vessels (100 gross tons each) carry a crew of 15 and have a cold-storage capacity for 20 metric tons of fish. The vessels were built for operation in warm climates and can fish anywhere in the Mediterranean Sea. After the crews have gained experience, it is expected that the vessels will also fish in the Atlantic Ocean.

With these new vessels, the National Fisheries Office now has a fleet of about 50 relatively large and modern fishing vessels. The National Fisheries Office (Office National des Peches) is a Government agency. (United States Embassy, Tunis, March 9, 1966, and previous reports.)

Note: See Commercial Fisheries Review, March 1966 p. 69, and June 1964 p. 58.



U.S.S.R.

PACIFIC SCALLOP PRODUCTION
AND EXPORTS TO U. S.:

In mid-April 1966, the vessels of the DALMORPRODUKT (the Far Eastern Specialized Marine Products Administration) began to fish for scallops in the Pacific Ocean. The season will continue throughout the rest of the year (7-8 months) and a total of 3,000 metric tons of landings are planned. In addition, 6 Sakhalin kolkhoz (cooperative) seiners also began harvesting scallops near the Kuril Islands, but their catches were small. Editor's Note: In 1965, the U.S.S.R. exported almost 650,000 lbs. (about 300 metric tons) of Pacific scallops to the U. S. A New York fishery broker and importer imported the scallops under a 5-year exclusive contract concluded with the Soviet Union in early 1965. Soviet scallop fishermen operating close to Siberian shores were accused of destroying the scallop stocks and beds and were ordered to stop that fishery until the resource recovered. As a result, the U.S.S.R. offered only

U.S.S.R. (Contd.):

small quantities for export in 1966 and the U. S. importer decided against taking any.

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FISH PRODUCTION COSTS:

Soviet economic studies show that one metric ton of fishery products can be produced in the U.S.S.R. with 25-30 percent less capital investment than the same quantity of meat products. Similarly, it costs 2-5 times as much to produce one ton of cattle (slaughter weight) as compared to one ton of fish (landed weight). (Rybnoe Khoziaistvo, March 1966.)

Note: See Commercial Fisheries Review May 1965 p. 77.

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EXPANSION OF PACIFIC FISHERIES:

By 1970, the Soviet Union plans to catch 3.2 million metric tons of fish, shellfish, and other aquatic products from the Pacific and Indian Oceans (including the catches of Far Eastern whaling flotilla in the Antarctic). The new plan, incorporated into the Draft of the 5-Year Plan, was submitted to the 23rd Congress of the Soviet Communist Party, which met in Moscow in March-April 1966. Ratified by the Congress automatically, the Plan has the force of any other Soviet Government regulation and is considered almost a law.

In 1965, the vessels of the Far Eastern Fisheries Administration (which directs Soviet fishing in Pacific and Indian Oceans) produced 1,970,000 metric tons of fishery landings. During the next 5 years, the yearly rate of increase will have to amount to about 240,000 tons of fishery landings to give a total catch of 3.2 million tons in 1970.

To obtain such large yearly increases, the Soviets intend to: (a) increase the exploitation of all available fishery resources of the North Pacific. Particular attention will be paid to deep-water trawling for halibut and sablefish. Another resource which will be exploited are the saury stocks off Aleutian Islands and off British Columbia. Since saury are now mostly caught in the nearby Sea of Japan by seiners, whose range is limited, new large saury-processing factoryships will be acquired. (b) expand into new, hitherto little exploited fishing areas in the South Pacific and Indian Oceans. One of the major

targets in the equatorial parts of this area are "the enormous tuna resources." An increase in the Far Eastern tuna fleet is foreseen. Another promising area is the New Zealand Plateau and the Great Australian Bight where large red snapper schools were discovered early in 1966 by two Soviet fishery research expeditions.

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PACIFIC OCEAN PERCH CATCHBY LARGE STERN FACTORY TRAWLER:

Soviet catches off United States and Canadian Pacific coasts are reported in the Kamchatskaia Pravda issue of April 12, 1966. The article described the homecoming of the large stern factory trawler Itelmen (BMRT 399). Constructed in 1965, the 3,200-gross-ton trawler left her home port of Petropavlovsk Kamchatskii (on the tip of the Kamchatka Peninsula) in December 1965. Most of her fishing was done off British Columbia (Queen Charlotte Islands). During 3 months of fishing, the Itelmen caught 4,082 metric tons (about 9 million pounds) of ocean perch and produced 2,170 tons of frozen products (packed in cases of 35 kg. or 77 pounds each), 370 tons of fish meal, and 16 tons of oil. The average catch per crew member during the 3 months was almost 200 tons (440,000 pounds).

Upon its arrival at Petropavlovsk on April 9, the Itelmen crew was received by the Secretary of the City Committee of the Communist Party, representatives of the Trade Unions, and by officials of the Kamchatka Regional Fisheries Administration. Being the top producer among the about 30-40 Soviet large factory stern trawlers in the Pacific, the crew of the Itelmen received a number of awards. One of the awards indicates that most of the Itelmen crew consists of members of "communist youth" probably in the age range of 18-25. All the honors and recognition were in addition to a handsome bonus paid to the fishermen for producing above the planned amounts.

The first quarterly plan for 1966 of the Itelmen provided for a catch of about 2,500-3,000 metric tons. Its 1966 official yearly catch plan of 10,980 metric tons was upped by the crew to 11,500 tons.

The Itelmen was scheduled to go to the Petropavlovsk shipyards for maintenance and

U.S.S.R. (Contd.):

repairs, which normally take a month to finish. But the enterprising crew of the Itelmen decided to work in the shipyard when on shore leave and to shorten the repair time to about 2-3 weeks.

Editor's Note: Although the Itelmen was the highest producer among the Soviet large stern factory trawlers (BMRT's) during January-March 1966, similar and even larger catches are not unusual among the Soviet Far East stern trawlers. In 1964, one of them landed 15,000 metric tons of fish (mostly ocean perch) and yearly catches of 10,000 metric tons are not uncommon.

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OCEAN PERCH FISHERY
OFF PRIBILOF ISLANDS:

In 1960, the Soviet fishing fleets began summer fishing for Pacific ocean perch near the Pribilof Islands after the herring season was over and caught about 7,000 metric tons. But in 1961 with the beginning of the highly successful Gulf of Alaska ocean perch fishing, the Pribilof area received no further attention. This year, however, Soviet Far Eastern fishery administrators began to make plans to begin anew the ocean perch fishery near the Pribilofs.

An additional resource of Pacific ocean perch discovered in 1965 is being fished by the Soviets in the vicinity of the Commander Islands; medium fishing trawlers are reportedly catching 2.5 metric tons of fish per drag.

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SHRIMP CATCH IN THE GULF OF ALASKA:

In the first 3 months of 1966, the Soviet shrimp fishing fleet (15 medium freezer trawlers of the type SRTM-Maiak) caught about 4,000 metric tons (8.4 million pounds) of shrimp south of the Aleutians near the Shumagin Islands. If the Soviet vessels were fishing for shrimp every day of their stay in the area (a total of about 1,300 vessel days), then their average catch would amount to almost 3 tons a day. Assuming that some fishing time was lost due to bad weather and other causes, their average daily catch was probably considerably higher.

Soviet shrimp operations in the Far East are directed by a special administrative unit

called DALMORPRODUKT (Far Eastern Specialized Marine Products Administration) whose main task is to develop fisheries for export products (shrimp, squid, scallops, mussels, seaweeds, etc.).

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SEALING OPERATIONS BEGIN IN PACIFIC:

Early in April 1966, the Far Eastern sealing fleet sailed from its home port at Vladivostok for 8 months of operations in the Bering Sea and the Sea of Okhotsk. In addition to bearded seals, the Soviets will also harvest sea lions, ringed seals, and other pinnipeds not protected by the International Fur Seal Convention.

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WHALING BEGINS IN THE NORTH PACIFIC:

The Sovetskaya Rossiya, which finished her Antarctic whaling operations by mid-April 1966, will continue whaling in the North Pacific for a few months before returning to her home port of Vladivostok. At the same time, other Soviet whalers left the Far Eastern ports to begin their operations off the Kuril Islands and (normally by mid-May) off the Aleutian Islands. Editor's Note: Not all the whale catch will be used for domestic production. As in previous years, part of the whale meat will be exported to Japan (5,000 metric tons in 1966); this year, also, for the first time, the Soviets will export to Japan 150 metric tons of whale hearts, fins, and peritonea.

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EXPANSION OF FISHING FLEET:

The Soviet Union plans to add 1,500 small and large vessels to her fishing fleet during the 5-Year Plan 1966-1970. Most of them will be constructed in domestic shipyards but foreign purchases, especially from Eastern Europe, will also be numerous.

The additions will consist of 13 different classes. Among the larger types of vessels the following planned additions are known: 150 large stern freezer trawlers (Maiakovskii class from the U.S.S.R. and Kosmos class from Poland); 100 large tropical stern trawlers (Atlantik class from East Germany); a 40,000-gross-ton giant fishing mothership (Vostok class, now being built at Leningrad); 145 refrigerated fish carriers (many purchased in Western Europe); an undetermined

U.S.S.R. (Contd.):

number of floating fish factories (Soviet, West German, Swedish, and Japanese construction); and others. Soviets admit that "there is not enough room" on existing fishing grounds for all of these vessels. The only way to successfully use the new additions is for them "to conquer new, unexploited fishing grounds." Most of these would be in the South Atlantic, South Pacific, and in the Indian Ocean.

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ADDITIONS TO PACIFIC FLEET:

The Nikolaev Shipyards (on the Black Sea) have begun the construction of 12 large factory stern trawlers of the Maiakovskii class (3,200 gross tons) for the Far Eastern Fisheries Administrations. The first trawler, the Valentin Kotelnikov, was delivered in mid-April 1966 and is on its way to the Pacific where it will be added to the Sakhalin fishing fleet. Editor's Note: In early 1966, the U.S.S.R. operated about 35 large stern factory trawlers in the Pacific and Indian Oceans; all were based in Soviet Far Eastern ports.

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FREEZER-TRAWLER "PRILUKI" DELIVERED TO SOVIETS BY DANISH SHIPYARD:

The freezer-trawler M/S Priluki was delivered to V/O Sudoimport, Moscow, by a Copenhagen shipyard March 21, 1966. The vessel is part of a series of freezer trawlers for the U.S.S.R. being built by the Danish shipyard to the following specifications:

length between perpendiculars 91 meters (298.5 feet), breadth 16 meters (52.5 feet), and deadweight tonnage 2,500 to 2,600 metric tons. The first vessel in the series was the M/S Skryplev launched May 10, 1962.

The Priluki can operate as a stern trawler, but it is designed primarily to operate as a freezer ship, receiving catches from other trawlers. The vessel is equipped with butchering lines to head and gut fish and airblast freezers for freezing dressed fish in blocks in metal pans. (Regional Fisheries Attache for Europe, United States Embassy, Copenhagen, March 30, 1966.)

(Editor's Note: The Priluki was reported to have joined the Soviet fleet in the Northwest Atlantic.)

Note: See Commercial Fisheries Review, February 1966 p. 83.

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EXPERIMENTAL CATAMARAN TRAWLER:

A Soviet shipyard in Kaliningrad is said to be building an experimental vessel made up of the hulls of two trawlers linked by a common deck. Plans call for this vessel to be tested in the Atlantic in 1966. The Soviets believe this catamaran vessel will make possible the use of very long sweep nets which will be fished from the stern. The catamaran is expected to catch twice as much fish as an average trawler.

Soviet specialists also plan to use the vessel to conduct studies on the efficiency of twin-hull fishing vessels. (Fishing News, London, April 1, 1966.)

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NORTHWEST ATLANTIC FISHERY RESEARCH:

After an 11,000-mile three-month cruise in the North Atlantic, the research vessel Sevastopol returned to Murmansk on March 10, 1966. Most of the biological studies were done off Greenland's western and eastern coasts (in the Davis and Denmark Straits), in the Sea of Labrador, and on the Grand Banks. In the Sea of Labrador, large schools of cod were discovered. By measuring water temperatures at various depths and at the bottom and comparing them to previous measurements, Soviet scientists determined that the Labrador Sea is becoming warmer. This to them indicates a future increase of cod resources in the Sea of Labrador. Ex-



The freezer-ship M/S Priluki which can also be used as a stern trawler.

U.S.S.R. (Contd.):

periments with deep-water trawling were also made.

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FISHERY AND OCEANOGRAPHIC STUDIES OF THE PACIFIC OCEAN:

The Pacific Science Association (Honolulu, Hawaii) was advised by the U.S.S.R. Academy of Sciences that the representative institution for the Association in the U.S.S.R. is the Academy. In July 1965, the Association was advised by the Presidium of the Academy that a Soviet National Committee had been created for the Association. That Committee requested the well-known Soviet scientist P. A. Moiseev, Deputy Director of the Soviet Federal Scientific Research Institute for Marine Fisheries and Oceanography (VNIRO), to prepare a short survey of Soviet fisheries and oceanographic research in the Pacific. This survey was published in the Information Bulletin of the Pacific Science Association (vol. 18, nos. 1 and 2, February - April 1966). Excerpts from the report follow:

The basin of the Pacific Ocean is characterized by varied flora and fauna. The vast area stretching from the Arctic to the Antarctic, the wide range of depths, some thousands of islands dispersed both in the boreal and in the tropical areas, the powerfully flowing permanent currents (principally the Kuroshio and the Humboldt Currents), the historical characteristics of the formation and settling of the aquatic fauna--all these characteristics of the Pacific Ocean make it extremely productive from the biological point of view.

Despite relatively little knowledge of the Pacific Ocean (considerably less than of the Atlantic Ocean), about 30 million metric tons of aquatic organisms, more than half of the world catch, are now caught in the Pacific Ocean. Certainly that level of catch taken by the fishery cannot be a limit, and after sufficiently thorough study of the resources of the Ocean, and with rational fishery (by taking measures aimed at the increase of biological productivity), the potential resources of the Ocean may ensure much higher catches of aquatic species. It is enough to recall the extremely rapid growth of catches taken by Peru (up to 9 million tons) and by the U.S.S.R. (up to 2 million tons), the sustainable high level of catch taken by Japan (6.5 million

tons), as well as catches taken by other countries to understand the great possibilities in the development of fisheries in the Pacific Ocean.

Taking into account the rapid growth of the population of Siberia and of the Soviet Far East, the U.S.S.R. fisheries investigations in recent years aimed at finding and studying fishery resources, mainly in those areas which are so far insufficiently investigated.

Twenty exploratory and research vessels (displacement from 400 to 4,000 tons) belonging to TINRO participated in the expeditionary work, in addition to some 15 vessels which were used for conducting research work. In addition, large amounts of biological and statistical materials were collected by various commercial vessels operating in different areas of the Pacific Ocean.

The northeast part of the Pacific Ocean, in contrast to earlier existing ideas, should be considered an extremely productive area of the World Ocean, which can ensure a catch of some million tons of aquatic species and, principally, of flatfish, Pacific ocean perch, herring, pollock, grenadier, shrimp, and others. This high productivity is assured by biogenic elements brought to the surface layers as a result of upwelling in the area of the Continental Slope (bathyal), which is clearly observed in the north part of the Pacific Ocean.

Fishery investigations in the north Pacific Ocean covered not only traditional depths usually fished by the fishing fleet, but were also conducted in relatively deep waters from 350 to 1,000 meters (1,148 to 3,281 feet) with good results. It appears that a number of fish species inhabit that area, feeding on organisms living in the surface layers, and forming dense concentrations which could ensure high and sustainable catches amounting to some tons per one-hour trawling. Scientific data collected by this expedition is being completed and four volumes have already been published.

Another vast area of the Pacific Ocean investigated thoroughly by the Soviet scientists during the last five years is its western part. Special attention was given to investigations of distribution, migration, and stock condition of saury near the east coast of Japan, in waters near the Kuril Islands, and in the area of drift in the Pacific Ocean. The results of investigations showed that saury stocks were

U.S.S.R. (Contd.):

large although at present Soviet and Japanese fishermen take only a small part of those stocks.

Studies on the biology of the Pacific salmon, and especially of the reasons for fluctuation in their abundance, were made in coordination with Japanese scientists. Soviet ichthyologists and oceanographers organized fishery research in the Seas of Japan and China, some of it carried out with North Korean and North Vietnamese scientists. The results of those investigations were published in different Soviet, Vietnamese, and Korean editions.

Soviet research vessels recently began operations in the vast tropical areas of the Pacific Ocean and the eastern part of the Indian Ocean with the purpose of finding oceanological characteristics of the fishing areas and providing a scientific basis for the development of tuna, dogfish, sailfish, and other pelagic fisheries. In addition, fishery investigations were carried out in some other areas of the southern part of the Pacific Ocean.

A number of specialized investigations of the biology of whales, fur seals, seals, commercial invertebrates, and algae were also made in various parts of the Pacific Ocean. Many of them (investigations of whales and fur seals) are based on programs coordinated with scientists of other countries, and the results are regularly presented to the International Commissions.

Soviet scientists assume that the Pacific Ocean area could ensure a much higher level of sustainable catch than it does now, provided that there is a thorough study based on scientific data and collaboration with other countries concerned in the utilization of water resources and in rational and effective fishery.

* * * * *

RESEARCH IN THE INDIAN OCEAN:

The fisheries and oceanography research vessel Mikhail Lomonosov (6,000 displacement tons) is scheduled to leave late in April 1966 for a cruise in the Indian Ocean. On previous trips, the vessel participated in the First Joint Cuban-Soviet Fishery and Oceanography Research Expedition in the Gulf of Mexico and the Caribbean Sea (1964-1965),

collaborated in the mapping of a Pacific Ocean relief map, and during September 1965-January 1966, studied the formation of radioactive fields in the Northeastern Atlantic.

* * * * *

STUDY OF FISH REACTION TO SOUND:

The Soviet fishery research vessel Tunets of the Polar Scientific Research Institute of Marine Fisheries and Oceanography (PINRO) spent a month and a half in the Bering Sea studying the reaction of fish to sound. Soviet scientists carried out hundreds of experiments using hydro-acoustic equipment and various frequencies and intensities of sound. The preliminary report claims that certain frequencies make fish gather into dense schools where they can be conveniently fished.

* * * * *

FISHERIES MINISTER TO VISIT JAPAN:

Soviet Fisheries Minister Ishkov was scheduled to visit Japan in May 1966 at the invitation of Japanese Minister of Agriculture Sakata to discuss technical cooperation in fisheries between both countries and the operations of Japanese fishermen around Shikotan Island and the Habomai Islands. The Habomai Islands and Shikotan, off Hokkaido's eastern tip, were occupied by Soviet forces at the close of World War II. The islands have been retained by the U.S.S.R. which claims jurisdiction over them until the signing of a peace treaty with Japan. The area is a traditional fishing ground for Japanese fishermen who have often been arrested by the Soviets for violating "Soviet territorial waters."

The first move for a Japanese-Soviet understanding of the thorny problem of the Japanese fishermen's operations in the southern Kurils was made during the 1965 visit of the then Japanese Minister of Agriculture Akagi to Moscow. Akagi was also received by Premier Kosygin and made a strong presentation of Japan's case. The Joint Communique issued after Akagi's visit mentioned this problem and included a Soviet promise to study it.

* * * * *

PATROL VESSELS ORDER JAPANESE TRAWLERS FROM FISHING AREA:

Japanese trawlers operating in the Sea of Japan about 18 miles off the coast of the Soviet Maritime Region (Primorskii Krai) of

U.S.S.R. (Contd.):

Siberia were ordered by a U.S.S.R. patrol vessel to leave the area. The incident, which occurred on March 14, 1966, and involved 16 Japanese trawlers, was reported to be the third such action by the Soviets in 1966. According to reports from Otaru City on the west coast of Hokkaido, the home port of the Japanese trawlers, previous similar incidents occurred on January 26 involving 6 vessels and February 15 involving 16 vessels. No such incidents took place in 1965.

As described by the captain of one of the fishing vessels, the Soviet patrol vessel first ordered the trawlers to move 15 miles to the east. The 16 trawlers moved as ordered but later that afternoon 3 Soviet patrol vessels ordered the Japanese to "leave the place." In addition to patrol vessels, a Soviet aircraft was also seen in the vicinity. It is reported that Japanese fishermen were protesting Soviet action which might adversely affect their livelihood. (Sankei, March 15, 1966.)



United Arab Republic

SOVIET FISH LANDINGS DROP OFF:

Sales of Soviet-delivered fish have fallen off from 30 metric tons a day to one-half ton a day during the past few years. Cold-storage stocks are reported as large and excessive. The reason for decreased sales is consumer resistance and possibly the refusal by fish brokers to handle Soviet products. (Al-Jumhuriyya, Cairo, September 26, 1965.)



United Kingdom

FISHERY LOAN INTEREST
RATES REVISED:

The British White Fish Authority announced that their rates of interest on loans made as from April 2, 1966, would be as follows:

For fishing vessels of not more than 140 feet, new engines, nets and gear: on loans for not more than 5 years, $7\frac{1}{2}$ percent (increase $\frac{3}{8}$ percent); on loans for more than 5 years but not more than 10 years, $7\frac{3}{8}$ percent (increase $\frac{3}{8}$ percent); on loans for more

than 10 years but not more than 15 years, $7\frac{1}{2}$ percent (increase $\frac{1}{2}$ percent); on loans for more than 15 years but not more than 20 years, $7\frac{3}{4}$ percent (increase $\frac{3}{8}$ percent).

The rate to processing plants for loans of not more than 20 years is unchanged at $7\frac{3}{4}$ percent.

The rates on loans made before April 2, 1966, are unchanged. (The Fishing News, London, April 7, 1966.)

Note: See Commercial Fisheries Review, January 1966 p. 98.

* * * * *

SOVIET FROZEN HERRING
QUALITY DISPUTE:

Trouble broke out at Aberdeen in March 1966 over a cargo of frozen herring brought by the Soviet vessel Sayani. The consignment was 150 metric tons.

After about 70 tons had been discharged, Aberdeen processors decided to return their consignments. The frozen herring were about to be reloaded, when the mate of the Sayani closed the hatches, refusing to let the herring back on board.

One of the Aberdeen processors said that the herring were of a different quality from the first consignment which had arrived towards the end of 1965. "The sizes of the Sayani's herring were mixed, from large downwards. They were packed differently and were more difficult to defrost. We had several tons ashore and sent them back," the processor pointed out.

Finally the processors who rejected the herring agreed to accept them.

Before going to Aberdeen the Sayani landed 350 tons of frozen herring at Yarmouth. (Fish Trades Gazette, March 19, 1966.)

* * * * *

LARGE FREEZER-TRAWLER
"CASSIO" LAUNCHED:

The freezer-trawler Cassio was launched at Glasgow, April 5, 1966. The vessel is the 4th in a series of 7 large freezer-trawlers being built for a British firm. The Cassio has a storage capacity for over 500 tons of frozen fish. The vessel is designed to stay at sea up to 58 days and can operate in both northern and tropical waters. Specifications of the vessel are: length overall 224 feet,

United Kingdom (Contd.):

length between perpendiculars $194\frac{3}{4}$ feet, breadth moulded 39 feet, depth moulded to upper deck 25 feet, depth moulded to main deck $17\frac{1}{2}$ feet, speed in service $13\frac{1}{2}$ knots, main diesel engine 2,350 horsepower, cold-storage capacity 27,000 cubic feet, and crew accommodations for 51. The vessel is equipped with a controllable pitch propeller. Main machinery space is at the afterend, enabling the cold-storage rooms to be placed amidships.

* * * * *

SUPPLY SITUATION FOR FROZEN PROCESSED GROUND FISH PRODUCTS, JULY-SEPTEMBER 1964-1965:

British stocks of frozen processed groundfish totaled 24,101 long tons on September 30, 1965, an increase of 36 percent over stocks

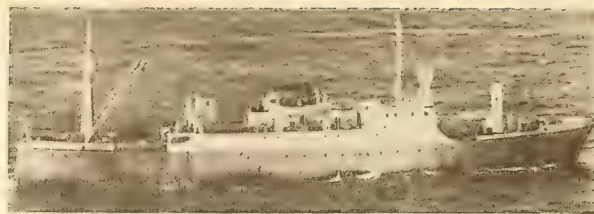


Fig. 1 - Large factory stern trawler, one of several Soviet vessels fishing in the Northwest Atlantic.

ly estimates to mid-April showed that about 75 Soviet vessels were operating off southern New England. By month's end, the fleet had increased to more than 100 vessels. The increase was due to the recent arrival of about 25 medium side trawlers (mainly from the Kaliningrad Fisheries Administration).

A total of 128 vessels (exclusive of duplication) were sighted during April and identi-

British Supply Situation for Frozen Processed Groundfish Products, July-September 1964-65

	1965			1964		
	Institutional Pack	Consumer Pack	Total	Institutional Pack	Consumer Pack	Total
	(Long Tons)					
Opening Stocks, July 1	15,104	8,332	23,436	10,882	10,077	20,959
Production, July-September	8,579	7,042	15,621	8,628	4,960	13,588
Imports, July-September:						
Denmark	1,321	1,135	2,456	969	1,963	2,932
Iceland	1,985	65	2,050	1,026	-	1,026
Norway	2,283	921	3,204	1,290	44	1,334
Netherlands	86	-	86	65	-	65
South Africa Republic	135	68	203	48	43	91
Japan	36	-	36	50	-	50
Canada	306	-	306	209	-	209
Germany	129	-	129	208	-	208
United States	6	-	6	3	-	3
Greenland	628	-	628	1	-	1
Faroe Islands	150	-	150	-	-	-
Other Countries	27	-	27	27	-	27
Total imports	7,092	2,189	9,281	3,896	2,050	5,946
Sales, July-September:						
Home market	10,774	9,729	20,503	10,916	8,535	19,451
Govt. estab. abroad	151	4	155	248	-	248
Ship's stores	157	-	157	192	-	192
Exports	2,009	1,413	3,422	1,929	903	2,832
Total sales	13,091	11,146	24,237	13,285	9,438	22,723
Stocks, September 30	17,684	6,417	24,101	10,121	7,649	17,770

on hand a year earlier. (British White Fish Authority.)



Foreign Fishing Off U. S. Coasts^{1/}

APRIL 1966:

Northwest Atlantic: U.S.S.R.: Soviet fishing in the Northwest Atlantic off the United States coast increased throughout April. Week-

^{1/}Based on information from surveillance flights by U. S. Bureau of Commercial Fisheries management agents with U. S. Coast Guard cooperation, plus information obtained from other sources.

fied as 56 large factory stern trawlers, 10 large freezer factory trawlers, 24 large side trawlers, 28 medium side trawlers, 4 refrigerated fish transports, 3 factory base ships, and 3 fuel and water carriers. This compares to 107 vessels sighted during March 1966 and 107 during April 1965.

Soviet fleets, operating generally in large groups, were dispersed along 200 miles of the 100-fathom curve of the Continental Shelf from Cape Hatteras to south and southeast of Cape Cod.



Fig. 2 - Aerial view of Soviet refrigerated transport vessel with factory stern trawler alongside in Northwest Atlantic.

The principal species of fish--whiting and red hake--caught by the Soviets remained unchanged for the past two months. But it appears that the Soviets are not putting as much emphasis on red hake as they did a year earlier but have concentrated primarily on catching whiting. The fact that many large factory stern trawlers had their reducing plants operating indicates that a portion of the catch is being reduced to fish meal.



Fig. 3 - Deck view of Soviet stern trawler in North Atlantic--mostly red hake and whiting (silver hake).

Only a few Soviet vessels fished on Georges Bank in April. This in all probability is attributed to the abundance of fish off southern New England and the Middle Atlantic coast.

SPAIN: In the first week of April, 24 Spanish vessels operating as "pair trawlers" were located in southeast Georges Bank. Heavy to moderate catches of fish observed on the decks of those vessels were primarily

large cod and haddock. The fishing gear in use appeared to be the proper mesh size. Crewmen on deck were beheading and splitting the fish prior to salting. No information is available on the location or operations of the Spanish fleet for the balance of the month.

CANADA: An estimated 30-35 Canadian fishing vessels fished for haddock in the Northeast Peak of Georges Bank in the first week of April (not far from the Spanish vessels). Because large concentrations of other foreign fishing vessels south of that area required increasing surveillance, no observations were made on Canadian fishing activities for the balance of April.

Off Mid-Atlantic Coasts: U.S.S.R.: Foreign vessel surveillance flights off the Middle Atlantic coast were drastically reduced due to poor weather conditions. Only 6 Soviet large factory stern trawlers were sighted and identified 65 miles east of Cape Henry, Va. They were fishing at depths of 50 to 75 fathoms. Heavy catches of fish on deck appeared to be primarily scup (porgies). Several hauls were observed with estimated catches of between 25,000 and 30,000 pounds of fish per haul. Dehydration plants were in operation on all vessels.

Although surveillance flights allowed only limited coverage, it is estimated that about 50 Soviet vessels fished intermittently along the mid-Atlantic coast during April.

In the Gulf of Mexico and Caribbean: NORWAY: Since leaving Norway in June 1965, a Norwegian shark fleet of four vessels (each equipped with radar, depth-recorder, and direction finder) has been fishing off the eastern and southeastern coasts of the United States in the Atlantic Ocean, the Gulf of Mexico, and the Caribbean Sea. In early 1966, the fleet sailed down the Central American coast to Trinidad, and then to Charleston, S. C., where supplies were taken on in March and April. The fleet's total catch (mainly brown and mackerel sharks with small quantities of dolphin and swordfish) probably did not exceed 450 tons after about 10 months of fishing. Long lines from 20 to 35 miles in length and equipped with radar buoys are reported to be the gear used. The catch is frozen for further processing in Norway or Germany. Italy is the intended market.

U.S.S.R.: No precise information on Soviet fishing in the Gulf of Mexico and Carib-

bean is available although Soviet sources report a recent increase in the number of vessels operating out of Cuba's newly-constructed fishing port at Havana.

Northeast Pacific: U.S.S.R.: In the first week of April, a part of the Soviet fishing fleet operating off British Columbia moved south into the Pacific ocean perch fishery off the Oregon coast. Since the fleet was widely dispersed, the same vessels were sighted in several locations. This led to exaggerated reports on the size of this fleet ("over 200 fishing vessels") in the local and national press.



Fig. 4 - In North Pacific, Soviet trawler transferring Pacific ocean perch to reefer vessel.

The total number of Soviet fishing vessels off Oregon during the first three weeks of April never exceeded 30 units. About 25 were medium fishing vessels of various types; the rest were processing vessels (refrigerators and base ships), tankers, and one research vessel. Up to two large stern factory trawlers were also sighted.

In the fourth week of April an important change took place with the arrival of 6 additional large stern trawlers from the disbanding flounder fishery in Bristol Bay. It is believed that the trend to employ more large stern factory trawlers (among the most efficient Soviet fishing vessels) will continue as long as fishing remains good.

As of April 29, the fleet totaled 37 vessels as compared to 26 vessels on April 2. Of the 37 vessels, 29 were fishing vessels--7 large stern factory trawlers and the balance medium trawlers with or without refrigeration and freezing equipment. The rest of the fleet included 4 large refrigerator transports and base ships (from 3,300 to 5,500 gross tons), 2 support vessels, 2 research vessels.

U. S. Bureau of Commercial Fisheries field agents estimated that the fleet was catching about 1.2 to 1.9 million pounds of fish a day. They believe that the Soviets in about 2 to 3 months will catch about 80 million pounds of

fish. However, the Bureau's Foreign Fisheries Specialists in Washington (who have access to Soviet data on average catches for vessels of the type fishing off the Pacific Northwest) estimate that the Soviets are catching somewhat less than 1.0 million pounds of fish a day.

The Soviet fleet, whose vessels at the beginning of April were scattered from Vancouver Island to Coos Bay (Oregon), was concentrated by mid-April on the Continental Shelf about 15-35 miles from Yaquina Head (Oregon). Trawling mostly in waters deeper than 100 fathoms, they were catching mainly Pacific ocean perch and some other rockfish species.

Ocean perch caught aboard the medium fishing trawlers without refrigeration (SRTs) are chilled and transhipped as soon as possible aboard modern refrigerator and processing vessels to be quick-frozen and transported to Siberian home ports. Medium fishing trawlers with refrigeration (SRTs) or freezing equipment (SRTMs) handle perch landings immediately but unload them eventually to refrigerated fish carriers. This enables those vessels as well as the SRTs to remain on fishing grounds for months at a time. Large stern factory trawlers freeze ocean perch themselves and either unload it (packaged in cartons) aboard refrigerated transports or take it to Soviet ports themselves, depending on the amount of time they have already spent at sea, mechanical condition of the vessels, and the cruise plan for the stern trawler.

Though most ocean perch are frozen, there is in the Soviet Far Eastern Fisheries underway a drive to begin large-scale production of ocean perch fillets. There is little doubt that perch fillets are in great demand in the Soviet Union.

The Soviets fished in strength off the Pacific Northwest twice before. In April 1965, a group of about 15 fishing vessels detached themselves from the Gulf of Alaska fleet and began fishing 50-150 miles west of Cape Flattery (off northern Washington State). After about 10 days of fishing they returned to the Gulf of Alaska. In mid-June 1965, a small Soviet fleet, accompanied by a research vessel and a refrigerated fish transport, again began fishing about 30-60 miles off Cape Flattery, and moved south to the waters off northern Oregon. But they soon departed for Alaskan fishing grounds.

The 1966 "expeditionary" pattern of the Soviet fleets, however, indicates that this time they intend to stay as long as fishing is good. A commander of the fleet aboard the base ship Churkin directs all fishing and processing operations. Fishing vessels are supported by refrigerated transports, tankers, fuel and water carriers, and research vessels. This allows the fleet to operate as an independent unit, which was not the case in 1965.

The real reason behind the 1966 Soviet move south off Oregon may be the fact that the Soviet Far Eastern Fisheries Administration was unable to fulfill the production quota for the first quarter of 1966. One way to increase the production is to tap unexploited and little exploited fishery stocks.

Alaska: JAPAN: At the end of April about 82 Japanese fishing vessels were operating off Alaska.



Fig. 5 - Japanese refrigerated fish transport and supply vessel supplying a wooden trawler with new nets in Gulf of Alaska. Typical high-seas support operations.

Only 1 fish meal and oil fleet remained in the Eastern Bering Sea by month's end. This fleet (composed of a factoryship and 30 trawlers) fished the Bristol Bay flat north of Unimak Island. Of the other fleet in this fishery, one returned to Japan and the second shifted to the shrimp fishery.



Fig. 6 - Japanese fish factoryship in Gulf of Alaska.

Of the 11 factory trawlers licensed by the Japanese to fish in the Gulf of Alaska this year, 2 began operations southwest of Kodiak Island in late April. The first trawler which arrived was boarded by a U. S. Bureau of Commercial Fisheries biologist observer as

part of the International North Pacific Fisheries Commission (INPEC) program to determine the effects of extensive trawling (primarily for ocean perch) upon Gulf of Alaska stocks of halibut and king crab.

Two other factory trawlers operated along the central Aleutians presumably for ocean perch during most of April.

Waters 100 to 200 fathoms in depth along the Continental Shelf edge northwest of Unimak Pass were fished by two additional Japanese factory trawlers in April. Observations and boarding indicated Alaska pollock comprised the vast bulk of the catches in that area.



Fig. 7 - Washing silt and dirt from trawl-caught fish on the main deck of a typical Japanese factoryship fishing off Alaska.

In early April, a factoryship with 11 trawlers moved from the pollock and flounder fishing ground near Unimak Pass to the usual shrimp-fishing region near the Pribilof Islands. This fleet was joined at the end of the month by a second factoryship with 13 accompanying trawlers.



Fig. 8 - Japanese stern-ramp trawler typifying the modern self-sufficient vessels catching and processing shrimp and Pacific perch in the eastern Bering Sea.

The Japanese king crab fishery in the Eastern Bering Sea reached full strength in

mid-April when the second factoryship joined her predecessor on the outer Bristol Bay ground. The factoryships, each of which is accompanied by five tangle net-handling trawlers, fished north of Port Moller in the same region as their Soviet counterparts.

U.S.S.R.: The total number of Soviet fishing and support vessels off Alaska decreased considerably during April from about 200 reported in March 1966 to about 160. This total number is somewhat smaller than it was last year at the same time.



Fig. 9 - Type of Soviet small trawler fishing in the eastern Bering Sea.

The transfer of vessels to the fishery off the Pacific Northwest reduced the size of the Gulf of Alaska Pacific ocean perch trawling fleet to about 70 vessels in mid-April. By month's end the Gulf fleet operating from Yakutat to Portlock Banks was again built up to about 100 vessels apparently by transfers from the disbanding Bristol Bay flounder fleet.

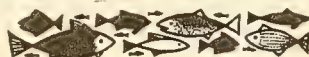


Fig. 10 - Zakharov-class factoryship operating in the king crab fishery of the eastern Bering Sea. In the shadow of the vessel is an SRT trawler. Factoryship carries 12 motorboats for king crab fishing - one is near the bow and another near the stern.

The Soviet shrimp fleet in the Gulf of Alaska consisted of 12 medium freezer trawlers (SRTMs) operating on the shrimp grounds near Shumagin Islands. The fleet was supported by one refrigerated carrier.

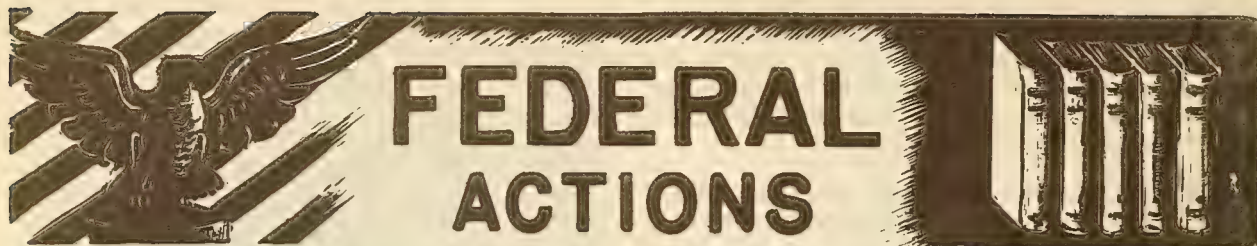
The flounder fleet in the outer Bristol Bay flats was being disbanded. Some of the participating vessels were transferred to the ocean perch fishing fleets, while others joined fisheries off Kamchatka. With the transfers to the Central Gulf of Alaska perch fleet, it is estimated that the remaining flounder fleet consists of 20 to 30 vessels.

In early April three Zakharov-class factoryships accompanied by about 11 tangle net-handling trawlers entered the king crab fishery in the Eastern Bering Sea (Bristol Bay). Throughout the month the vessels concentrated on the traditional crab-fishing grounds north of Port Moller (mid-Alaska Peninsula).



STURGEON IS THE LARGEST FRESH-WATER FISH

The giant sturgeon (*Huso huso*), inhabitant of the Volga River, and other large rivers emptying into the Black Sea, is the largest fresh-water fish species in the world. The largest known was 14 feet 2 inches, weighing 2,250 pounds. (Conservation Notes, Iowa State Conservation Commission, March 28, 1966.)



FEDERAL ACTIONS

Department of the Interior

COMMERCIAL FISHERIES RESEARCH AND DEVELOPMENT ACT

FEDERAL AID FOR FISHERY PROJECTS:

Following is a listing of the approved projects under the Commercial Fisheries Re-

search and Development Act (Public Law 88-309), which is administered by the Bureau of Commercial Fisheries, U. S. Department of the Interior. The list includes those projects approved from January 1, 1966, through April 1, 1966. Subsequent listings will be published at the end of each quarter.

APPROVED PROJECT PROPOSALS Section 4(a) - Public Law 88-309

State	Project	Title	Total First Year Cost	Date Approved
Alabama	2-29-C	Construction of Public Oyster Landing Facilities	\$ 9,000	2/16/66
Alabama	2-18-R	Oyster Pond and Raft Production	30,000	3/15/66
Alabama	2-31-C	Oyster Rearing Pond Construction	8,000	3/16/66
Alabama	2-30-D	Shell Planting for Oyster Cultch	42,000	2/28/66
Alabama	2-34-R	Cooperative Gulf of Mexico Estuarine Inventory - Alabama	43,333	4/1/66
Alaska	5-12-C	King Salmon Headquarters - Architectural Plans	30,000	3/31/66
California	6-5-S	Coordination of Public Law 88-309 in California	26,532	2/23/66
Colorado	6-2-D	Raising Bait Fishes in the Rocky Mountain States	32,000	2/28/66
Connecticut	3-33-S	Coordination	3,800	2/4/66
Connecticut	3-44-R	Investigations on the Lobster	17,142	3/8/66
Connecticut	3-45-R	Investigation of the Life Histories and Potential Fishery of River Herrings in Connecticut	17,142	3/11/66
Florida	2-17-R	A Study of Reproduction in Some Commercially Important Fishes	11,000	1/21/66
Georgia	2-32-R	Preliminary Survey of Existing and Potential Marine Resources on the Georgia Coast	3,600	2/24/66
Guam	H-7-D	A Study to Determine the Feasibility of Developing a Deep-Sea Commercial Fishing Industry on Guam	34,333	3/25/66
Hawaii	H-1-D	Development of a Prawn Fishery	38,542	3/31/66
Hawaii	H-3-R	Central Pacific Tuna Conference	4,000	1/27/66
Hawaii	H-5-R	Management Investigation of Two Species of Spiny Lobsters	15,009	3/25/66
Illinois	4-13-R	Clam Industry in Illinois	15,000	1/18/66
Illinois	4-14-R	Investigation and Management of Commercial Fisheries	20,000	2/28/66
Massachusetts	3-38-R	Identification of Winter Flounder Sub-populations	20,000	2/4/66
Massachusetts	3-35-R	Marine Food Science and Technology Research on Sanitation and Handling for Purposes of Improving Product Quality and Shelf-life of Massachusetts Commercial Fishery Products	39,000	1/14/66
Massachusetts	3-39-C	Cat Cove Dike Repair	35,000	1/14/66
Massachusetts	3-40-S	Coordination of Research and Development	34,096	1/14/66
New York	3-10-C	Construction of a Marine Research and Development Laboratory	171,676	2/25/66
North Dakota	4-15-R	Garrison Reservoir Commercial Fishery Investigations	6,600	2/28/66
Oregon	1-25-R	Utilization of Hake for Human Food	19,000	2/7/66
Oregon	1-26-R	Biological Effects of Parasitized Hake in Relation to its Use as a Food	11,000	2/7/66
Oregon	1-28-R	Distribution and Abundance of Dungeness Crab	33,000	3/31/66

(Listing continued on next page)

State	Project	Title	Total First Year Cost	Date Approved
Rhode Island	3-43-R	Investigation of the Deep Sea Red Crab	10,500	2/10/66
Rhode Island	3-46-R	Investigation of the Basic Life History of the Red Crab	11,700	3/31/66
Virgin Islands	2-33-R	Study of the Fisheries Potential of the Virgin Islands	24,000	4/1/66
Washington	1-22-R	Monitor Condition of Certain Groundfish Stocks, Washington Trawl Grounds	40,000	3/21/66
Washington	1-23-R	Investigation of Pacific Ocean Perch, and other Sebastodes sp.	16,000	3/21/66
Washington	1-24-D	Inspection of Oyster Seed, New Asiatic Sources	6,000	2/25/66
Washington	1-29-R	Early Marine Life History, Chum and Pink Salmon	16,000	3/24/66
Washington	1-30-R	Field Recovery, Coded Wire Tag	18,300	3/25/66

Public Law 88-309, which was signed by the President on May 20, 1964, provides for payment of \$5 million annually to states for commercial fishery research and development over a five-year period. The states will be required to provide matching funds equal to at least 25 percent of project costs.

* * * * *

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

HEARINGS ON APPLICATIONS FOR FISHING VESSEL CONSTRUCTION DIFFERENTIAL SUBSIDY:

The following firms have applied for fishing vessel construction differential subsidies to aid in the construction of vessels to engage in various fisheries:

Grace & Philip, Inc., 159 Washington St., Gloucester, Mass. 01930, 110-foot wood vessel for groundfish, whiting, ocean catfish, flounder and other flat fish, porgy, herring, and other species for industrial uses. The Bureau of Commercial Fisheries, U. S. Department of the Interior, published the notice of the hearing in the March 30, 1966, Federal Register.

Liberty Queen, Inc.; Pacific Prince, Inc.; Liberty King, Inc.; Pacific Queen, Inc.; and

Pacific King, Inc.--all of the same address--582 Tuna St., Terminal Island, Calif. 90731, each for a 149.5-foot steel vessel for albacore, skipjack, and yellowfin tuna, mackerel, sardines, hake, and anchovies. Notices of the hearings appeared in the April 15, 1966, Federal Register.

Ann-B, Inc., 11516 Palatine Ave. North, Seattle, Wash. 98133, 85-foot vessel, for bottomfish, flounder and sole, halibut, sardine, tuna, herring, hake, crab, shrimp, scallop, and dogfish fisheries. Notice appeared in April 22, 1966, Federal Register.

Northbeach, Inc., 10572 14th Ave. Northwest, Seattle, Wash., 97-foot vessel, for bottomfish, halibut, flounder and sole, tuna, hake, herring, shrimp, crab, and scallop fisheries. Notice appeared in April 22, 1966, Federal Register.

Hearings on the economic aspects of the applications were scheduled to be held.

Note: See Commercial Fisheries Review, May 1966 p. 90.

* * * * *

APPLICATIONS FOR FISHING VESSEL LOANS:

The following applications have been received for loans from the U. S. Fisheries Loan Fund to aid in financing the construction or purchase of fishing vessels:

Firm and Address	Overall Size	Fisheries	Application Notice in <u>Federal Register</u>
Frank Brenha, Jr., & Ida Marie Brenha 3146 Garrison St. San Diego, Calif. 92106	101 ft.	Tuna	..... (1966) April 1
George Bold & Fritz Bold 527 Finch Bldg. Aberdeen, Wash. 98520	74.9 ft.	Hake, bottomfish	"
Levi McKinley 1300 Number 2-A West 9th Juneau, Alaska 99801	34.7 ft.	Halibut, salmon	"

(Continued on next page)

Firm and Address	Overall Size	Fisheries	Application Notice in Federal Register (1966)
Samuel Martin Box 104 Seldova, Alaska 99663	Gill-net vessel	Salmon	April 5
Glenn J. Couch P. O. Box 572 Homer, Alaska 99603	39 ft.	Salmon, halibut, Dungeness crab	April 7
Dorothy M. O'Hara, Inc. Tillson Wharf Rockland, Maine 04841	111 ft.	Groundfish, scallops, lobsters, flounder	April 9
David V. Hall P. O. Box 161 Petersburg, Alaska 99833	45.5 ft.	Salmon, halibut	April 16
Steven V. Hotch P. O. Box 195 Haines, Alaska 99827	34 ft.	Salmon in southeastern Alaskan waters	April 21
James M. Brandenburg 135 Sentar Rd. Carpinteria, Calif. 93013	57 ft.	Salmon, albacore, bottomfish	April 28
Richard L. Yates East Boothbay, Maine 04544	30 ft.	Lobster	April 28

Regulations and procedures governing fishery loans have been revised and no longer require that an applicant for a new or used vessel loan replace an existing vessel (Public Law 89-85; Fisheries Loan Fund Procedures--50 CFR Part 250, as revised August 11, 1965).

Note: See Commercial Fisheries Review, May 1966 p. 90.

* * * * *

REQUIREMENTS ADOPTED FOR CONDITION OF COATING OF U. S. STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP:

A proposal to adopt an amendment to U. S. Standards for Grades of Frozen Raw Breaded Shrimp (Title 50, Part 262) was published in the Federal Register, April 5, 1966, by the Bureau of Commercial Fisheries, Department of the Interior. The features of these changes are to correct certain typographical errors, and to provide for the inclusion of 20 percent of the sample unit in evaluating the factor "condition of coating."

A series of surveys and meetings have been held with the breaded shrimp industry following previous notices in the Federal Register. It is now mutually agreed that 20 percent of the sample unit should be used rather than the 10 percent factor when point deductions are assessed for the factor "condition of coating."

The changes as published in the Federal Register of April 5, 1966, which became effective on that date follow:

Title 50—WILDLIFE AND FISHERIES

Chapter II—Bureau of Commercial Fisheries, Fish and Wildlife Service, Department of the Interior

SUBCHAPTER G—PROCESSED FISHERY PRODUCTS, PROCESSED PRODUCTS THEREOF, AND CERTAIN OTHER PROCESSED FOOD PRODUCTS

PART 262—UNITED STATES STANDARDS FOR GRADES OF FROZEN RAW BREADED SHRIMP

Miscellaneous Amendments

Notice is hereby given that pursuant to the authority vested in the Secretary of the Interior by sections 203 and 205 of Title II of the Agricultural Marketing Act of 1946, as amended, and of the authority transferred to the Department of the Interior by section 6(a) of the Fish and Wildlife Act of 1956, as amended, it is proposed to adopt an amendment to Title 50, Part 262—U.S. Standards for Grades of Frozen Raw Breaded Shrimp, as set forth below. The features of these changes are to correct certain typographical errors, and to provide for the inclusion of 20 percent of the sample unit in evaluating the factor "condition of coating."

The effective date of December 3, 1965, for the factor "condition of coating" was stated in the FEDERAL REGISTER of Tuesday, August 3, 1965, to allow the breaded shrimp industry time to modify and adjust its operations to meet the requirements of the higher standards of quality for breaded shrimp. Further extensions

of the effective date of the "condition of coating" were published in issuances of the FEDERAL REGISTER dated December 9, 1965, and February 16, 1966. Subsequently, a series of surveys and meetings have been held with industry and it is now mutually agreed that 20 percent of the sample unit should be used rather than the 10 percent factor when point deductions are assessed for the factor "condition of coating."

Inasmuch as this amendment involves a technical change in Title 50, Part 262, notice and public procedure thereon has been deemed unnecessary since persons affected have previously been given an opportunity to make suggestions, comments or objections to the proposed amendment.

Therefore, the proposed changes shall become effective on the date of publication in the FEDERAL REGISTER.

DONALD L. MCKERNAN,
Director.

APRIL 1, 1966.

1. Amend the last paragraph of § 262.21(s) to read:

A proportionate amount of the loose bread-ing and frost must be added to the weight of the sample in paragraph (u) (2) (ii) of this section.

2. Amend § 262.25, Table 1—Schedule of Point Deductions for Rating in Frozen Breaded State, to read:

TABLE 1—SCHEDULE OF POINT DEDUCTIONS FOR RATING IN FROZEN BREADED STATE			
Factor	Quality description	Deductions allowed	
		Points	
1. Loose breading or frost	2 percent but less than 3 percent.....	5	
	3 percent but less than 5 percent.....	10	
	5 percent or more.....	31	
2. Ease of separation	Separate easily after being removed from carton and exposed to room temperature for not more than 4 minutes.	3	
	Separate easily after being removed from carton and exposed to room temperature for not more than 6 minutes.	6	
	Does not separate easily after being removed from carton and exposed to room temperature for 6 minutes.	10	
3. Uniformity	Ratio of weight of largest to smallest breaded shrimp in sample unit as defined under section 262.21 (T):		
	Up to 1.50.....	0	
	1.51-1.50.....	1	
	1.61-1.70.....	2	
	1.71-1.80.....	3	
	1.81-1.90.....	4	
	1.91-2.00.....	5	
	2.01-2.10.....	6	
	2.11-2.20.....	7	
	2.21-2.30.....	8	
	2.31-2.40.....	9	
	Over 2.40.....	10	
4. Condition of coating	Degree of halo or hailing up or holidays (identify type of defect by circling the proper word):		
	Slight—each 20 percent by count or fraction thereof.....	1	
	Moderate—each 20 percent by count or fraction thereof.....	2	
	Marked—each 20 percent by count or fraction thereof.....	4	
5. Damaged breaded shrimp	Excessive—each 20 percent by count or fraction thereof.....	16	
6. Extraneous material	For each 5 percent by count or fraction thereof.....	3	
	Tail fin broken or missing, each 5 percent or fraction thereof (except in Type I, subtype C, and Type II, subtype C).....	1	
¹ Filthy or deleterious substances in food products constitute a violation of the Food, Drug, and Cosmetic Act. Products containing such substances are ineligible for the purpose of applying this document.			

Note: See Commercial Fisheries Review, April 1966 p. 77.

* * * * *

PROPOSED REGULATIONS FOR EASTERN PACIFIC TUNA FISHERIES:

Donald L. McKernan, Director, U. S. Bureau of Commercial Fisheries, published a notice in the Federal Register, on May 25, 1966, giving notice that the Secretary of the Interior proposes to add regulations for the Eastern Pacific Tuna Fisheries consisting of Part 280--Yellowfin Tuna and Part 281--Restrictions on Tuna Imports.

Part 280--Yellowfin Tuna includes sections in connection with definitions, basis and purpose, catch limit, open season, closed season, restrictions applicable to cargo vessels, reports and record keeping, and persons and vessels exempted.

Part 281--provides a framework within which imports of yellowfin tuna would be denied entry into the United States from countries which do not cooperate in this international fisheries conservation program.

Interested persons were given the opportunity to submit any data, views, or arguments in writing and to comment orally at a public hearing on the proposed regulations for the Eastern Pacific Tuna Fisheries.

The proposed regulations as published in the Federal Register, May 25, 1966, follow:

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

150 CFR Parts 280, 281

EASTERN PACIFIC TUNA FISHERIES

Notice of Proposed Rule Making

Notice is hereby given, pursuant to section 4(a) of the Administrative Procedure Act of June 11, 1946 (60 Stat. 237), and section 6(c) of the Tuna Conventions Act of 1950 (64 Stat. 778), as amended by the Act of October 15, 1962 (76 Stat. 923; 16 U.S.C. 955), that the Secretary of the Interior proposes to amend Title 50, Code of Federal Regulations, by adding a new Subchapter H—Eastern Pacific Tuna Fisheries, consisting of Part 280—Yellowfin Tuna and Part 281—Restrictions on Tuna Imports. The proposed regulations are set forth in tentative form below.

The proposed regulations are to be issued under the authority contained in subsection (c) of section 6 of the Tuna Conventions Act of 1950, as added by the Act of October 15, 1962. In accordance with the authority cited, after adoption of the regulations proposed as Part 280 and publication thereof in the FEDERAL REGISTER, such regulations are to become applicable to all vessels and persons subject to the jurisdiction of the United States on such date as the Secretary of the Interior shall prescribe, but in no

event prior to an agreed date for the application by all countries whose vessels engage in fishing for species of fish covered by the Convention for the Establishment of an Inter-American Tropical Tuna Commission (1 U.S.T. 230), in the regulatory area on a meaningful scale of effective measures for the implementation of the Commission's recommendations applicable to all vessels and persons subject to their respective jurisdictions. Steps are being taken to reach agreement with the several countries whose fishermen participate in the tuna fisheries of the eastern Pacific Ocean looking toward _____ as the date for the simultaneous application by all such countries of suitable conservation measures to be observed by their fishing vessels.

Prior to the final adoption of the proposed regulations, consideration will be given to any data, views, or arguments pertaining thereto which are submitted in writing to the Regional Director, Pacific Southwest Region, Bureau of Commercial Fisheries, 101 Seaside Avenue, Terminal Island, Calif., 90731, within the period of 30 days from the date of publication of this notice in the FEDERAL REGISTER. Interested persons will also be afforded an opportunity to comment orally on the proposed regulations at a public hearing to be held at United Portuguese Club, 2818 Addison Street, San Diego, Calif., beginning at 10 a.m., June 14, 1966. Any person who intends to present views orally at such hearing is requested to furnish in writing his name and the name of the organization he represents, if any, to the said Regional Director not later than June 7, 1966.

Issued at Washington, D.C., and dated May 23, 1966.

DONALD L. MCKERNAN,
Director.

SUBCHAPTER H—EASTERN PACIFIC TUNA FISHERIES

PART 280—YELLOWFIN TUNA

- Sec.
280.1 Definitions.
280.2 Basis and purpose.
280.3 Catch limit.
280.4 Open season.
280.5 Closed season.
280.6 Restrictions applicable to cargo vessels.
280.7 Reports and record keeping.
280.8 Persons and vessels exempted.

AUTHORITY: The provisions of this Part 280 issued under sec. 6, 64 Stat. 778, as amended, 16 U.S.C. 955.

§ 280.1 Definitions.

For the purposes of this part, the following terms shall be construed, respectively, to mean and to include:

(a) *Convention.* The Convention for the Establishment of an Inter-American Tropical Tuna Commission, signed at Washington, May 31, 1949, by the United States of America and the Republic of Costa Rica (1 U.S.T. 230).

(b) *Commission.* The Inter-American Tropical Tuna Commission established pursuant to the Convention.

(c) *Director of Investigations.* The Director of Investigations, Inter-American Tropical Tuna Commission, La Jolla, Calif.

(d) *Bureau Director.* The Director of the Bureau of Commercial Fisheries, Fish

and Wildlife Service, U.S. Department of the Interior.

(e) *Regional Director.* The Regional Director, Pacific Southwest Region, Bureau of Commercial Fisheries, 101 Seaside Avenue, Terminal Island, Calif.

(f) *Regulatory area.* All waters of the eastern Pacific Ocean bounded by the mainland of the Americas and the following lines: Beginning at a point on the mainland where the parallel of 40 degrees north latitude intersects the coast; thence due west to the meridian of 125 degrees west longitude; thence due south to the parallel of 20 degrees north latitude; thence due east to the meridian of 120 degrees west longitude; thence due south to the parallel of 5 degrees north latitude; thence due east to the meridian of 110 degrees west longitude; thence due south to the parallel of 10 degrees south latitude; thence due east to the meridian of 90 degrees west longitude; thence due south to the parallel of 30 degrees south latitude; thence due east to a point on the mainland where the parallel of 30 degrees south latitude intersects the coast.

(g) *Yellowfin tuna.* Any fish of the species *Thunnus albacares* (synonym: *Neothunnus macropterus*).

(h) *Other tuna fishes.* Those species (and none other) of the family Scombridae which are known as:

(1) *Albacore*—*Thunnus alalunga* (synonym: *Thunnus germon*).

(2) *Bigeye*—*Thunnus obesus* (synonym: *Parathunnus sibi*).

(3) *Bluefin*—*Thunnus thynnus* (synonym: *Thunnus saliens*).

(4) *Skipjack*—*Euthynnus pelamis* (synonym: *Katsuwonus pelamis*).

(i) *Fishing vessel.* Every kind, type, or description of watercraft subject to the jurisdiction of the United States (other than purse seine skiffs) used in or outfitted for catching or processing fish or transporting its catch of fish from fishing grounds.

(j) *Cargo vessel.* Every kind, type, or description of watercraft which is not employed in fishing but which is engaged in whole or in part in the transportation of fish or fish products.

(k) *Person.* Individual, association, corporation, or partnership subject to the jurisdiction of the United States.

(l) *Open season.* The time during which yellowfin tuna may lawfully be captured and taken on board a fishing vessel in the regulatory area without limitation on the quantity permitted to be retained during each fishing voyage. Unless otherwise specified, whenever time is stated in hours it shall be construed to refer to standard time in the area affected.

(m) *Closed season.* The time during which yellowfin tuna may not be taken or retained on board a fishing vessel in quantities exceeding the amounts permitted to be taken and retained as an incident to fishing for other tuna fishes.

§ 280.2 Basis and purpose.

(a) At a special meeting held at Long Beach, Calif., on September 14, 1961, the Commission recommended to the Governments of Costa, Rica, Ecuador, Panama, and the United States of America, parties to the Convention, that they take joint action to limit the annual catch of yellowfin tuna from the eastern Pacific Ocean by fisherman of all nations during the calendar year 1962. This recom-

mendation was made pursuant to paragraph 5 of Article II of the Convention on the basis of scientific investigations conducted by the Commission over a period of time dating from 1951. The most recent years of this period were marked by a substantial increase in fishing effort directed toward the yellowfin tuna stocks, resulting in a rate of exploitation of these stocks greater than that at which the maximum average sustainable yield may be obtained. The Commission's recommendation for joint action by the parties to regulate the yellowfin tuna fishery has as its objective the restoration of these stocks to a level of abundance which will permit maximum average sustainable catch and the maintenance of the stocks in that condition in the future.

(b) At annual meetings held at Quito, Ecuador, May 16-18, 1962; at Panama City, Panama, April 16-17, 1963; at San Diego, Calif., March 18-19, 1964; at Mexico City, Mexico, March 23-24, 1965; and at Guayaquil, Ecuador, April 19-20, 1966, the Commission affirmed its conclusions regarding the need for regulating the yellowfin tuna fishery in the eastern Pacific Ocean and at each meeting recommended to the parties to the Convention that they take joint action to:

(1) Establish a prescribed tonnage limit on the total catch of yellowfin tuna by the fishermen of all nations during each calendar year from an area of the eastern Pacific Ocean defined by the Commission;

(2) Establish open and closed seasons for yellowfin tuna under prescribed conditions;

(3) Permit the landing of not more than fifteen percent (15%) by weight of yellowfin tuna among the tuna taken on a fishing trip made after the close of the yellowfin tuna fishing season; and

(4) Obtain from governments not parties to the Convention, but having vessels which operate in the fishery, cooperation in effecting the recommended conservation measures.

(c) The regulations in this part are designed to implement the Commission's recommendations for the conservation of yellowfin tuna so far as they affect all vessels and persons subject to the jurisdiction of the United States.

§ 280.3 Catch limit.

The annual limitation on the quantity of yellowfin tuna permitted to be taken from the regulatory area during the open season by the fishing vessels of all nations participating in the fishery will be fixed and determined on the basis of recommendations made by the Commission pursuant to paragraph 5 of Article II of the Convention. Upon approval by the Secretary of State and the Secretary of the Interior of the recommended catch limit, announcement of the catch limit thus established shall be made by the Bureau Director through publication of a suitable notice in the FEDERAL REGISTER. The Bureau Director, in like manner, shall announce any revision or modification of an approved annual catch limit which may subsequently enter into force.

§ 280.4 Open season.

The open season for yellowfin tuna fishing shall begin annually at 12:01 a.m.

of the first day of January and terminate at midnight on a date to be determined and announced as provided in § 280.5.

§ 280.5 Closed season.

(a) Pursuant to authority granted by the Commission, the Director of Investigations maintains records of the catches of yellowfin tuna made in the regulatory area from time to time during the open season by the fishing vessels of all nations participating in the fishery. By taking into account the cumulative round weight of such yellowfin tuna catches and the estimated additional quantities of yellowfin tuna expected to be caught by the fishing vessels of all nations operating in the regulatory area, the Director of Investigations will determine the date on which he deems the annual catch limit will be reached and will promptly notify the Bureau Director of such date. The Bureau Director shall announce the season closure date thus established by publication in the *FEDERAL REGISTER*. The closure date so announced shall be final except that if it shall at any time become evident to the Director of Investigations that the catch limit will not be reached by such date, he may substitute another date which shall be announced by the Bureau Director in like manner as provided for the date originally determined.

(b) Except as provided in paragraphs (c) and (d) of this section, after the date determined in the manner provided in this section for the closing of the yellowfin tuna fishing season, it shall be unlawful for any master or other person in charge of a fishing vessel to possess on board such vessel or to bring yellowfin tuna to any port or place in the United States until the yellowfin tuna fishing season reopens on January 1 next following the close of the season.

(c) Any fishing vessel which has departed port to engage in yellowfin tuna fishing prior to the date of the closure of the yellowfin fishing season may continue to take and retain yellowfin tuna without restriction as to quantity until the fishing voyage has been completed by unloading from such fishing vessel the whole or any part of the cargo of tuna taken during such voyage.

(d) After the close of the yellowfin tuna fishing season as provided in this section, yellowfin tuna captured as an incident to fishing for other tuna fishes may be taken on board a fishing vessel and brought to any port or place in the United States in an amount not exceeding fifteen percent (15%) by round weight of all tuna fishes on board the fishing vessel.

(e) The limitation on the quantity of incidentally caught yellowfin tuna specified in paragraph (d) of this section shall be applicable to any fishing vessel irrespective of its arrival in the United States prior or subsequent to December 31 in every case where the catch of tuna has been made during a fishing voyage begun in the closed season.

§ 280.6 Restrictions applicable to cargo vessels.

(a) A fishing vessel shall be deemed to have completed a fishing voyage whenever the whole or any part of its catch of tuna from the regulatory area shall be transferred to a cargo vessel in

conformity with the requirements of this section.

(b) In keeping with the provisions of section 251, Title 46, United States Code, no foreign-flag vessel, whether documented as a cargo vessel or otherwise, is permitted to land in a port of the United States any tuna fish or tuna fish products taken on board such vessel on the high seas.

(c) The transfer of tuna from a fishing vessel to a cargo vessel while in a foreign country or its territorial waters will be governed by the laws and regulations of such foreign country.

(d) During the closed season for yellowfin tuna, no fishing vessel shall transfer on the high seas any part of its catch of tuna fish to a cargo vessel documented under the laws of the United States and no such cargo vessel shall receive, possess, or bring to any place in the United States, tuna fish taken on board on the high seas from a fishing vessel unless the cargo vessel shall hold a permit issued in conformity with paragraph (e) of this section.

(e) Upon written application made to him, the Regional Director may issue a permit authorizing a cargo vessel documented under the laws of the United States, to receive, possess, and transport to the United States, tuna fish transferred from fishing vessels on the high seas during the closed season on yellowfin tuna. Such permit may authorize the possession and transportation of yellowfin tuna by a cargo vessel without regard to the quantities of yellowfin or other tuna fishes received or possessed on board such vessel during the closed season on yellowfin tuna and shall contain such additional conditions and restrictions as the Regional Director shall determine to be necessary in light of the circumstances in each case to achieve compliance with the regulations in this part and the objectives of the program for the conservation of the yellowfin tuna resources of the regulatory area.

§ 280.7 Reports and record keeping.

The master or other person in charge of a fishing vessel or such person as may be authorized in writing to serve as the agent of either of such persons shall—

(a) Annually, prior to the initial departure of such vessel to engage in yellowfin tuna fishing, furnish to the Regional Director (either by letter or on a form obtainable from the Regional Director) a report specifying the name, official number, home port, and cargo capacity (in tons of frozen tuna) of the vessel, and the names and addresses of the managing owner and master, respectively, of the vessel intended to be used in fishing for yellowfin tuna in the regulatory area.

(b) Not earlier than 48 hours prior to each departure from port to engage in fishing for yellowfin tuna during the open season for such tuna, furnish to the Regional Director, either by letter, telegram, radiogram, or on a form obtainable from the Regional Director, a report certifying that all tuna fishes taken during the immediately preceding fishing voyage, if any, have been unloaded and that the vessel is departing port to engage in or resume yellowfin tuna fishing. A report as required by this subsection shall be dispatched from the vessel's port of departure for a fish-

ing voyage and if in letter form the report shall be dispatched by airmail in every case except from ports of departure on the Pacific coast of the United States, where surface mail may be used for such purpose. A copy of the report showing the date of dispatch of the original shall be authenticated by affixing the stamp, seal, or signature of the postal official or employee of the telegraph or radiogram company transmitting the report, as the case may be, and such authenticated copy shall be retained on board the reporting vessel for a period of 6 months following the date of the report. The failure of any vessel, irrespective of cause, to depart upon a fishing voyage within the 48-hour period specified in this subsection shall require the furnishing in like manner of a new report not earlier than 48 hours prior to the delayed departure time.

(c) Keep an accurate log of all operations conducted from the vessel, entering therein for each day the date, noon position (stated in latitude and longitude or in relation to known physical features) and the estimated quantities (in short tons, round weight), of tuna fish by species which are taken on board the vessel: *Provided*, That the record and bridge log maintained at the request of the Commission shall be deemed a sufficient compliance with this paragraph whenever the items of information specified herein are fully and accurately entered in such log.

(d) Report by radio at least once each calendar week during a fishing voyage conducted in the open season; such reporting to begin on a date to be announced by the Bureau Director through publication of a suitable notice in the *FEDERAL REGISTER* and to continue throughout the open season. Reports by radio shall be made directly or through a cooperating vessel to Radio Station WWD, La Jolla, Calif., 4415.8 kc, 8805.6 kc, 12403.5 kc, or 16533.5 kc or by prepaid commercial radio message directed to the Director of Investigations. Radio reports shall be made between 0900 and 2400 P.s.t., and shall state the name of the fishing vessel and the cumulative estimated quantities, by species, of all tuna fish taken on board from week to week throughout the duration of the fishing voyage. Weekly reports containing all items of information required by this subsection may be submitted to the Director of Investigations by the shore representative of the master or other person in charge of the vessel in lieu of radio reports from the vessel.

(e) Furnish on a form obtainable from the Regional Director, following the delivery or sale of a catch of tuna made by means of such vessel, a report, certified to be correct as to facts within the knowledge of the reporting individual, giving the name and official number of the fishing vessel, the dates of commencement and conclusion of the fishing voyage and listing separately by species and round weight in pounds or short tons, the gross quantities of each species of tuna fish so sold or delivered: *Provided*, That, at the option of the vessel master or other person in charge, a copy of the fish ticket, weigh-out slip, settlement sheet, or similar record customarily issued by the fish dealer or his agent may be used for reporting purposes, in lieu of the form obtainable from the Regional Director.

if such alternate record is similarly certified and contains all items of information required by this paragraph: *Provided further*, That for any vessel landing its catch in California and reporting by means of a copy of the California fish ticket, the California Fish and Game boat number may be indicated in lieu of the vessel's official number. Such report shall be delivered or dispatched by mail to the Regional Director within 72 hours after the weigh-out has been completed.

§ 280.3 Persons and vessels exempted.

Nothing contained in §§ 280.2 to 280.7 shall apply to:

(a) Any person or vessel authorized by the Commission, the Bureau Director, or any State of the United States to engage in fishing for research purposes.

(b) Any person or vessel engaged in sport fishing for personal use.

PART 281—RESTRICTIONS ON TUNA IMPORTS

Sec.

281.1 Definitions.

281.2 Basis and purpose.

281.3 Species subject to regulation.

281.4 Species under investigation by the Commission.

281.5 Investigations authorized.

281.6 Publication of findings.

281.7 Proof of admissibility.

281.8 Removal of import restrictions.

AUTHORITY: The provisions of this Part 281 issued under sec. 6, 64 Stat. 778, as amended, 16 U.S.C. 955.

§ 281.1 Definitions.

For the purposes of this part, the following terms shall be construed, respectively, to mean and to include:

(a) *United States*. All areas under the sovereignty of the United States, the Trust Territory of the Pacific Islands, and the Canal Zone.

(b) *Convention*. The Convention for the Establishment of an Inter-American Tropical Tuna Commission, signed at Washington, May 31, 1949, by the United States of America and the Republic of Costa Rica (1 U.S.T. 230).

(c) *Commission*. The Inter-American Tropical Tuna Commission established pursuant to the Convention.

(d) *Bureau Director*. The Director of the Bureau of Commercial Fisheries, Fish and Wildlife Service, U.S. Department of the Interior.

(e) *Regulatory area*. All waters of the eastern Pacific Ocean bounded by the mainland of the Americas and the following lines: Beginning at a point on the mainland where the parallel of 40 degrees north latitude intersects the coast; thence due west to the meridian of 125 degrees west longitude; thence due south to the parallel of 20 degrees north latitude; thence due east to the meridian of 120 degrees west longitude; thence due south to the parallel of 5 degrees north latitude; thence due east to the meridian of 110 degrees west longitude; thence due south to the parallel of 10 degrees south latitude; thence due east to the meridian of 90 degrees west longitude; thence due south to the parallel of 30 degrees south latitude; thence due east to a point on the mainland where the parallel of 30 degrees south latitude intersects the coast.

(f) *Yellowfin tuna*. Any fish of the species *Thunnus albacares* (synonymy: *Neothunnus macropterus*).

(g) *Other tuna fishes*. Those species (and none other) of the family Scombridae which are known as:

(1) Albacore—*Thunnus alalunga* (synonymy: *Thunnus germon*).

(2) Bigeye—*Thunnus obesus* (synonymy: *Parathunnus sibi*).

(3) Bluefin—*Thunnus thynnus* (synonymy: *Thunnus saliens*).

(4) Skipjack—*Euthynnus pelamis* (synonymy: *Katsuwonus pelamis*).

(h) *Fishing vessel*. Every kind, type, or description of watercraft (other than purse seine skiffs) used in or outfitted for catching or processing fish or transporting fish from fishing grounds.

(i) *Person*. Individual, association, corporation, or partnership.

§ 281.2 Basis and purpose.

(a) At a special meeting held at Long Beach, Calif., on September 14, 1961, the Commission recommended to the Governments of Costa Rica, Ecuador, Panama, and the United States of America, parties to the Convention, that they take joint action to limit the annual catch of yellowfin tuna from the eastern Pacific Ocean by fishermen of all nations during the calendar year 1962. This recommendation was made pursuant to paragraph 5 of Article II of the Convention on the basis of scientific investigations conducted by the Commission over a period of time dating from 1951. The most recent years of this period were marked by a substantial increase in fishing effort directed toward the yellowfin tuna stocks, resulting in a rate of exploitation of these stocks greater than that at which the maximum average sustainable yield may be obtained. The Commission's recommendation for joint action by the parties to regulate the yellowfin tuna fishery has as its objective the restoration of these stocks to a level of abundance which will permit maximum average sustainable catch and the maintenance of the stocks in that condition in the future.

(b) At annual meetings held at Quito, Ecuador, May 16–18, 1962; at Panama City, Panama, April 16–17, 1963; at San Diego, Calif., March 18–19, 1964; at Mexico City, Mexico, March 23–24, 1965; and at Guayaquil, Ecuador, April 19–20, 1966, the Commission affirmed its earlier conclusions regarding the need for regulating the yellowfin tuna fishery in the eastern Pacific Ocean and at each meeting recommended to the parties to the Convention that they take joint action to:

(1) Establish a prescribed tonnage limit on the total catch of yellowfin tuna by the fishermen of all nations during each calendar year from an area of the eastern Pacific Ocean defined by the Commission;

(2) Establish open and closed seasons for yellowfin tuna under prescribed conditions;

(3) Permit the landing of not more than 15 percent (15%) by weight of yellowfin tuna among the tuna taken on a fishing trip made after the close of the yellowfin tuna fishing season; and

(4) Obtain from governments not parties to the Convention, but having vessels which operate in the fishery, cooperation

in affecting the recommended conservation measures.

(c) In conformity with the provisions of section 6(c) of the Act and simultaneously with the adoption of the regulations in this part, the Secretary of the Interior has made effective Part 280 of this title for the purpose of carrying out the recommendations of the Commission for the conservation of yellowfin tuna in the regulatory area so far as such recommendations affect all vessels and persons subject to the jurisdiction of the United States.

(d) The yellowfin tuna stocks recommended for regulation by the Commission constitute a significant part of an international high seas fishery in which the vessels of a number of countries are engaged in varying degrees. Since some of the countries are not parties to the Convention and, therefore, have no applicable treaty obligations to fulfill, the achievement of the conservation objectives with respect to the tuna resources of the eastern Pacific Ocean is dependent upon international cooperative efforts to implement the Commission's recommendations. With a view toward encouraging effective cooperation on the part of such countries, the Tuna Conventions Act of 1950, as amended, directs that restrictions be established on the importation of certain tuna fish from any country which shall fail to take action to prevent the occurrence of certain proscribed activities. Thus, section 6(c) of the Act provides that the Secretary of the Interior, with the concurrence of the Secretary of State, shall promulgate regulations—

(1) To prohibit the entry into the United States, from any country when the vessels of such country are being used in the conduct of fishing operations in the regulatory area in such manner or in such circumstances as would tend to diminish the effectiveness of the conservation recommendations of the Commission, of fish in any form of those species which are subject to regulation pursuant to a recommendation of the Commission and which were taken from the regulatory area; and

(2) To prohibit entry into the United States, from any country, of fish in any form of those species which are subject to regulation pursuant to a recommendation of the Commission and which were taken from the regulatory area by vessels other than those of such country in such manner or in such circumstances as would tend to diminish the effectiveness of the conservation recommendations of the Commission.

(e) Section 6(c) of the Act further provides that "in the case of repeated and flagrant fishing operations in the regulatory area by the vessels of any country which seriously threaten the achievement of the objectives of the Commission's recommendations, the Secretary of the Interior, with the concurrence of the Secretary of State, may, in his discretion, also prohibit the entry from such country of such other species of tuna, in any form, as may be under investigation by the Commission and which were taken in the regulatory area."

(f) By letter of May 8, 1964, the Secretary of State concurred in the promulgation of the regulations in this part. Such regulations are designed to implement the provisions of section 6(c) of the Act with respect to import controls and to prescribe procedures for the establishment of restrictions on imports of

tuna whenever such action shall be deemed warranted.

§ 281.3 Species subject to regulation.

The species of fish currently subject to regulation pursuant to a recommendation of the Commission within the meaning of section 6(c) of the Act is yellowfin tuna.

§ 281.4 Species under investigation by the Commission.

The species of fish currently under investigation by the Commission within the meaning of section 6(c) of the Act are yellowfin tuna, skipjack tuna, and bigeye tuna.

§ 281.5 Investigations authorized.

(a) The Bureau Director shall cause to be made from time to time such inquiries and investigations as may be necessary to keep himself and other persons concerned currently informed regarding the nature and effectiveness of the measures for the implementation of the Commission's recommendations which are being carried out by countries whose vessels engage in fishing within the regulatory area. In making a finding as to whether or not a country is condoning the use of vessels in the conduct of fishing operations in the regulatory area in such manner or in such circumstances as would tend to diminish the effectiveness of the conservation recommendations of the Commission, the Bureau Director shall take into account, among such other considerations as may appear to be pertinent in a particular case, the following factors:

(1) Whether or not the country provides or causes to be provided to the Commission pertinent statistics on a timely basis.

(2) Whether or not the country has in force conservation measures applicable to its own fishermen adequate for the implementation of the Commission's recommendations.

(3) Whether or not the country has in force measures for the control of landings in its ports of species subject to regulation which are taken in the regulatory area by fishermen of other countries contrary to the Commission's conservation recommendations.

(4) Whether or not the country, having put conservation measures into effect, takes reasonable action to enforce such measures.

(5) The number of vessels of the country which conduct fishing operations in the regulatory area.

(6) The quantity of species subject to regulation taken from the regulatory area by the country's vessels contrary to the Commission's conservation recommendations and its relationship to (i) the total quantity permitted to be taken by the vessels of all countries participating in the fishery and (ii) the quantity of such species sought to be restored to the stocks of fish pursuant to the Commission's conservation recommendations.

(7) Whether or not repeated and flagrant fishing operations in the regulatory area by the vessels of the country seriously threaten the achievement of the objectives of the Commission's recommendations.

(b) Any person who shall have reason to believe that the vessels of any country

are being used in the conduct of fishing operations in the regulatory area in such manner or in such circumstances as would tend to diminish the effectiveness of the conservation recommendations of the Commission or that other acts within the purview of the import control provisions of section 6(c) of the Tuna Conventions Act of 1950, as amended, are occurring or are likely to occur, may communicate his belief to the Bureau Director. Every such communication shall contain or be accompanied by a full statement of the reasons for the belief, including a detailed description of such specific acts or events as may support the belief, and such other pertinent facts as may indicate a need for instituting an investigation as authorized in this part.

(c) Upon receipt by the Bureau Director of any communication submitted pursuant to paragraph (b) of this section and found to comply with the requirements of that paragraph, the Bureau Director promptly shall cause such investigation to be made as appears to be warranted by the circumstances of the case. In conducting such investigation the Bureau Director or his designated representative shall consider any representations offered by foreign interests, importers, brokers, domestic producers, or other interested persons. Unless good cause to the contrary shall exist, every such investigation shall be completed within 60 days following receipt of the communication.

§ 281.6 Publication of findings.

If it shall be determined on the basis of section 281.5 that species of fish subject to regulation or under investigation by the Commission, as the case may be, are ineligible for entry into the United States from a particular country pursuant to the provisions of section 6(c) of the Act, the Bureau Director, with the approval of the Secretary of the Interior and, when required by law, with the concurrence of the Secretary of State, shall publish a finding to that effect in the FEDERAL REGISTER. Effective upon the date of publication of such finding in the FEDERAL REGISTER every shipment of fish in any form of the species under regulation or under investigation by the Commission offered for entry either directly or indirectly from the country named in the finding shall be denied entry unless it shall be established by satisfactory proof pursuant to § 281.7 that a particular shipment of such fish is not ineligible for entry; *Provided*, That entry shall not be denied and no such proof shall be required for any such shipment which, on the date of such publication, was in transit to the United States on board a vessel operating as a common carrier.

§ 281.7 Proof of admissibility.

For the purposes of § 281.6 of this part and section 8(c) of the Tuna Conventions Act of 1950, as amended, a shipment of fish in any form of the species under regulation or under investigation by the Commission offered for entry, directly or indirectly, from a country named in a finding published under such § 281.6 shall be deemed to be eligible for entry if the shipment is accompanied by a certificate of eligibility, executed in the form and manner set forth below,

certifying that the tuna in the shipment are not of the species specified in the published finding or, if of such species, were not taken in the regulatory area. The required certificate of eligibility must be executed by a duly authorized official of the country named in the published finding and the certificate must be authenticated with respect to the signature and official position of the person executing the same by a consular officer or consular agent of the United States.

CERTIFICATE OF ELIGIBILITY

I, _____, an authorized officer of the Government of _____, certify that the shipment of tuna fish accompanied by this certificate, consisting of _____ of _____ (Quantity) (Species) _____ bearing the following marks and numbers _____ (Number and kind of packages or containers) _____

(a) Contains no fish of the species prohibited entry into the United States by virtue of a finding of ineligibility published under regulations issued pursuant to section 6(c) of the Tuna Conventions Act of 1950, as amended.

(b) Contains fish of the species prohibited entry into the United States by virtue of a finding of ineligibility published under regulations issued pursuant to section 6(c) of the Tuna Conventions Act of 1950, as amended, but that such fish were caught in the waters of _____

(Identify area or areas in which fish were taken) _____ by vessels subject to the jurisdiction of _____ and that none of the said fish (Country) _____ was taken in any part of the eastern Pacific Ocean subject to conservation regulations pursuant to recommendations of the Inter-American Tropical Tuna Commission.

(Signature)

(Title)

(Address)

[This certificate must be accompanied by a certificate of authentication executed by a consular officer or consular agent of the United States.]

§ 281.8 Removal of import restrictions.

Upon a determination by the Bureau Director that the conditions no longer exist which warranted the imposition of import restrictions against the country named in the finding published pursuant to § 281.6, the Bureau Director, with the approval of the Secretary of the Interior, shall publish a finding to such effect in the FEDERAL REGISTER. Effective upon the date of publication of such finding, the prior existing import restrictions against the country designated therein shall terminate: *Provided*, That for a period of 1 year from such date of publication every shipment of fish in any form of the species subject to regulation or under investigation by the Commission shall continue to be denied entry unless the shipment is accompanied by a certification executed by an authorized official of the country of export and authenticated by a consular officer or consular agent of the United States, certifying that no portion of the shipment is comprised of fish which are of species under regulation and which were prohibited from entry under the prior existing import restrictions.



U. S. Tariff Commission

HEARING ON IMPORT DUTIES FOR CERTAIN PRODUCTS INCLUDING CANNED CLAMS:

The United States Tariff Commission has ordered a public hearing to be held in connection with an investigation instituted under section 332 of the Tariff Act of 1930 on certain products including "certain canned clams" which for import duty purposes are subject to the American selling price basis of valuation. Notice of the institution of the investigation was issued on December 23, 1965, and was published in the Federal Register on December 29, 1965.

The hearing was scheduled to be held in Washington, D. C., on June 8, 1966. Information and views were to be submitted either in writing or by oral testimony at the public hearing, or both. Interested parties desiring to appear and to be heard were requested to notify the Secretary of the Commission, in writing, at least three days in advance of the date set for the hearing. Written submissions were to be received by the Commission not later than June 10, 1966.

The Notice of Investigation and Date of Hearing was announced by the Tariff Commission on May 2, 1966, and published in the Federal Register, May 5, 1966.

In connection with its investigation, the Commission published a list of converted rates of duty for clams other than razor clams (including clam pastes and sauces but not clam chowder) in airtight containers. Included also are whole clam meats, minced clam meats, smoked whole clam meats, clam sauce, and oriental specialties (seasoned, baked, and broiled clams canned in Japan). Copies of the list, titled "List of Tentative Converted Rates of Duty Together with Explanatory Material," were available from the U. S. Tariff Commission, Washington, D. C. 20436, and New York, N. Y.

Note: See Commercial Fisheries Review, February 1966, p. 90.



Department of the Treasury

BUREAU OF CUSTOMS

TUNA CANNED IN BRINE IMPORT QUOTA FOR 1966:

The quantity of tuna canned in brine which may be imported into the United States during

calendar year 1966 at the 12½ percent rate of duty is limited to 65,662,200 pounds (or about 3,126,771 standard cases of 48 7-oz. cans). This is 0.6 percent less than the 66,059,400 pounds (about 3,145,685 cases) in 1965; but 7.8 percent more than the 60,911,870 pounds (about 2,900,565 cases) in 1964; 4.0 percent more than the 63,130,642 pounds (about 3,006,221 cases) in 1963; and 11.2 percent over the 59,059,014 pounds (about 2,812,000 cases) in 1962. Compared with the 57,114,714 pound limit in 1961, the 1966 quota is about 15.0 percent greater, and is 22.9 percent more than the 53,448,330-pound limit set in 1960. Any imports of tuna canned in brine in excess of the 1966 quota will be dutiable at 25 percent ad valorem under item 112.34, Tariff Schedules of the United States.

The quota for 1966 is based on the United States pack of canned tuna during the preceding calendar year (1965), as reported by the U. S. Fish and Wildlife Service.

The 1966 tariff-rate quota was published in the Federal Register, page 6324, April 26, 1966, by the Bureau of Customs of the U. S. Department of the Treasury.

Note: See Commercial Fisheries Review, July 1965 p. 104.

* * * * *

INQUIRY INSTITUTED ON FISHERY PRODUCTS IMPORTED FROM U. S. S. R.:

The Bureau of Customs, U. S. Department of the Treasury, received information recently indicating a possibility that fishery products imported from the Soviet Union are being, or likely to be, sold at less than fair value within the meaning of the Antidumping Act, 1921, as amended. In order to establish the validity of such information, the Bureau of Customs is instituting an inquiry based on provisions of the Customs Regulations.

A summary of the information received and developed within the Customs Service states: "The product and price information discloses that substantial quantities of fishery products referred to as shellfish and mollusks are being sold to the U. S. purchaser at prices substantially lower than those normally pertaining to such or similar fishery products imported from countries not having a controlled economy."

According to the Treasury Department, U. S. imports of the merchandise involved from January 1, 1966, to date amounted to about \$375,000.

An Antidumping Proceeding Notice, Fishery Products from the U.S.S.R., was published by the Commissioner of Customs in the Federal Register, April 19, 1966.



Eighty-Ninth Congress (Second Session)



Public bills and resolutions which may directly or indirectly affect the fisheries and allied industries are reported upon. Introduction, referral to committees, pertinent legislative actions by the House

and Senate, as well as signature into law or other final disposition are covered.

COMMERCIAL FISHERIES RESOURCES SURVEY: The Subcommittee on Merchant Marine and Fisheries of Senate Committee on Commerce Apr. 19, 1966, hearings on S. J. Res. 29, authorizing a survey of marine and fresh water commercial fishery resources of the U. S., and its possessions, having as its witnesses Dr. Stanley A. Cain, Assistant Secretary for Fish and Wildlife and Parks, and Donald L. McKernan, Director, Bureau of Commercial Fisheries, both of the U. S. Department of the Interior. In a statement, the Bureau's director said that such a survey "would provide a useful summary of the status of our fisheries at this critical stage of their history. It would provide the Congress, the fishing industry, the public, and the Department with an inventory of resources now utilized or still lying unused in our inland and marine waters, their condition and potential yield. It would identify the methods by which these resources can be managed for full utilization and how their value could be enhanced by appropriate legislation or technological development. . . . In view of the development of foreign fishing off our coasts utilizing resources important to the full development of United States fisheries, the survey contemplated by this proposal becomes increasingly significant."

COMMODITY PACKAGING AND LABELING: Introduced in House H. R. 14498 (Vanik), Apr. 19, 1966, and H. R. 14633 (Donohue), Apr. 26, 1966, to regulate interstate and foreign commerce by preventing the use of unfair or deceptive methods of packaging or labeling of certain consumer commodities distributed in such commerce, and for other purposes; to Committee on Interstate and Foreign Commerce.

Senate Committee on Commerce Apr. 20, 1966, met in executive session to continue consideration of S. 985, proposed Fair Packaging and Labeling Act of 1966, but did not conclude action thereon and will meet again on Wednesday, Apr. 27.

ECOLOGICAL RESEARCH AND SURVEY: Senate Committee on Interior and Insular Affairs held hearings Apr. 27, 1966, on S. 2282, to authorize the Secretary of the Interior to conduct a program of research, study, and surveys, documentation and description of the natural environmental systems of the United States for the purpose of understanding and evaluating the condition of these systems and to provide information to those concerned with natural resources management. Testimony was received from Secretary Stewart L. Udall and Dr. Stanley Cain, Assistant Secretary for Fish and Wildlife and Parks, both of the Department of the Interior.

ESTUARINE INVESTIGATION: S. 3240 (Tydings and 1 other) introduced in Senate Apr. 19, 1966, to amend the Federal Water Pollution Control Act so as to provide for a study and investigation of estuaries and estuarine zones of the United States; to Committee on Public Works. Rep. Tydings pointed out in Congressional Record, Apr. 19, 1966 (pp. 7910-7911), that bill would authorize the Secretary of the Interior to initiate a 3-year, \$3 million comprehensive study of pollution in the tidal estuaries and their immediately adjacent land areas. The Interior Department will issue a comprehensive report, once the project is completed. This report will be the first comprehensive accumulation of estuarine knowledge to ever exist. As such, it will be of enormous value to laymen and scientists alike, of this country and of others, who are concerned about this most vital of areas.

FACTORY FISHING VESSELS: H. R. 14459 (Hathaway) introduced in House Apr. 19, 1966, to assist the domestic construction of three advanced-design factory fishing vessels; to Committee on Merchant Marine and Fisheries.

FISH AND WILDLIFE COORDINATION ACT AMENDMENT--FEDERALLY LICENSED PROJECTS (EFFECTS ON FISH AND WILDLIFE): H. R. 15001 (Ottinger) introduced in House May 11, 1966, to amend the Fish and Wildlife Coordination Act to provide adequate notice and opportunity for the Secretary of the Interior and State fish and wildlife agencies to conduct studies on the effects of projects licensed by Federal agencies on fish and wildlife resources, and for other purposes; to Committee on Merchant Marine and Fisheries.

Subcommittee on Fisheries and Wildlife Conservation of House Committee on Merchant Marine and Fisheries held hearings May 11, 1966, on H. R. 9492, to amend the Fish and Wildlife Coordination Act to provide adequate notice and opportunity for the Secretary of the Interior and State fish and wildlife agencies to conduct studies on the effects of projects licensed by Federal agencies on fish and wildlife resources; H. R. 14414, to amend the Fish and Wildlife Coordination Act to make it applicable to the Atomic Energy Commission, the Federal Power Commission, and to permittees and licensees of such commissions; and H. R. 14455, to repeal section 9 of the Fish and Wildlife Coordination Act. Testimony was heard from L. C. White, Chairman, FPC; and Frank E. Smith, member of the Board of Directors of TVA.

FISH AND WILDLIFE COORDINATION ACT--ATOMIC ENERGY COMMISSION--FEDERAL POWER COMMISSION: Introduced in House H. R. 14414 (Reuss), Apr. 7, and H. R. 14975 (Ottinger), May 10, 1966, to amend the Fish and Wildlife Coordination Act to make it applicable to the Atomic Energy Commission, and to per-

mittees and licensees of such Commissions; to Committee on Merchant Marine and Fisheries.

S. 3279 (Metcalf) introduced in Senate Apr. 27, 1966, to amend the Fish and Wildlife Coordination Act to make it applicable to the Atomic Energy Commission and to permittees and licensees of such Commission; to Committee on Commerce.

FISHERIES: Sen. Magnuson inserted in Congressional Record, Apr. 19, 1966 (p. 7935), an article which appeared in the Mar. 31, 1966, issue of Seattle Post-Intelligencer, titled "Mexicans Complaining of Russian Fishing" by John Chamberlain. Magnuson stated what is needed is some enforceable international convention that will limit and apportion the fishing take in ways that will result in keeping waters from being fished out.

FISHERIES--OREGON: Sen. Morse spoke from the floor of the Senate (Congressional Record, Apr. 13, 1966, pp. 7746-7748), concerning Soviet fishing trawlers that have come into high-sea waters 10 to 30 miles off the coast of Oregon to carry on an extensive fishing expedition. He stated that he thought the U. S. should make representations to the Soviet Government that we would like to proceed with diplomatic negotiations forthwith in an endeavor to see if some understanding can be reached with the Soviet Government in respect to its regulating the fishing practices of its fleet of Russian fishing trawlers on a give-and-take basis. He inserted in the Record a list of conventions that are now in force between the U. S. and other nations, which was supplied by the staff of the Senate Foreign Relations Committee.

FISHING LIMIT OF 12 MILES: Sen. Magnuson inserted in Congressional Record, May 3, 1966 (pp. 9093-9094), a resolution which was adopted Jan. 27, 1966, by the Norwegian Commercial Club, Seattle, Washington. The resolution points out the threat of foreign fishing operations and provides a very thoughtful statement in support of our extended fishery jurisdiction. He stated that the club has also gone on record in support of legislation he introduced (S. 2218) to establish a 12-mile fishery zone off our coast to protect our domestic fishery resources.

Subcommittee on Merchant Marine and Fisheries of Senate Committee on Commerce held hearings May 18, and 19, on S. 2218, to establish a contiguous fishery zone beyond the territorial sea of the United States.

Introduced in House H. R. 14961 (Pelly), May 10, 1966, and H. R. 15011 (Wyatt) May 11, 1966, to establish fishing zones of the United States beyond its territorial seas, and for other purposes; to Committee on Merchant Marine and Fisheries. Rep. Pelly pointed out in Congressional Record, May 10, 1966 (pp. 9760-9761), his bill would provide for a congressional declaration that the fishing zones of the United States will be extended to the edge of the Continental Shelf, or 12 miles, whichever extends further; would provide for a zone somewhat along the lines of Canada's 12-mile fishing zone, except that under this bill the fishing zone would extend the outer boundary to include the Continental Shelf, which is generally defined as 200 meters in depth, or 655 feet. He also listed the following provisions of the bill: (a) Contains provision to assure that this legislation would not conflict with the jurisdiction of any foreign country, whereby the President could set a boundary in substitution if he determined that part of the fishing zone boundary should be changed, (b) Authorizes the State Department, in consultation with the Department of the Interior, to consult with foreign nations to ascertain the extent, manner, and annual

average catch of their fishing boats in any of the affected area, and (c) Allows right to fish in the fishing zone to any foreign nation whose fishermen have established historic fishing rights within such zones during the 10 calendar years preceding the enactment of this law.

FISH PROTEIN CONCENTRATE PLANTS: Introduced in House H. R. 14699 (Keith), Apr. 27, 1966, H. R. 14842 (King of Utah), May 3, and H. R. 14905 (O'Neill of Mass.), May 5, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, production by the commercial fishing industry of fish protein concentrate; to Committee on Merchant Marine and Fisheries. Rep. Keith spoke in the House and pointed out in Congressional Record, Apr. 27, 1966 (pp. 8731-8732), that the bill differs from other bills that have been filed on the subject inasmuch as it provides that fish protein concentrate will be eligible for distribution under the provisions of the Food for Freedom Act. Other bills referred to Public Law 480 of the 83rd Congress, which is due to expire soon and probably be replaced by the food for freedom program. He further stated that passage of this bill, he believes, will produce a great deal of benefit per tax dollar expended in terms of international good will, improving our balance of payments and boosting our fishing industry.

Hearings scheduled to be heard May 2 and 3, 1966, in Washington, D. C., before the Senate Committee on Commerce on S. 2720, to authorize the Secretary of the Interior to develop, through the use of experiment and demonstration plants, practicable and economic means for the production by the commercial fishing industry of fish protein concentrate, were rescheduled for May 16 and 17.

Rep. Keith in extension of remarks inserted in Congressional Record, Apr. 26, 1966 (p. A2226), an editorial that appeared in the March 31, 1966, edition of the New Bedford Standard-Times. He stated that today, fish protein concentrate is awaiting the approval of the Food and Drug Administration. He also stated that there must be no further delay in putting fish protein concentrate to use. Government and industry must both get to work and "sell" fish protein concentrate.

FUR SEAL CONSERVATION AND PRIBILOF ISLANDS ADMINISTRATION: The Senate, May 5, 1966, received H. J. Res. 92 of the Legislature of the State of Alaska, requesting transfer of jurisdiction over the resources of the Pribilof Islands to the State of Alaska. Referred to Committee on Commerce.

INTERIOR DEPARTMENT APPROPRIATIONS FY 1967: Subcommittee of Senate Committee on Appropriations, Apr. 22, 1966, in executive session, approved for full committee consideration, H. R. 14214, a bill making appropriations for the Department of the Interior and related agencies (includes United States fish and Wildlife Service and its two Bureaus: Commercial Fisheries, and Sport Fisheries and Wildlife) for the fiscal year ending June 30, 1967.

Senate Committee on Appropriations, in executive session, May 19, 1966, ordered favorably reported with amendments H. R. 14215, fiscal 1967 appropriations for the Department of the Interior, and related agencies. As approved by the committee the bill would provide a total of \$1,329,755,000, an increase of \$34,585,500 over the House-passed figure of \$1,295,169,500.

NATIONAL SEA GRANT COLLEGES AND PROGRAM

ACT OF 1965: Introduced in House H. R. 14460 (Hathaway), H. R. 14462 (Huot), Apr. 19, 1966, and H. R. 14873 (Keith), May 4, to amend the National Science Foundation Act of 1950, as amended, so as to authorize the establishment and operation of sea-grant colleges and programs by initiating and supporting programs of education, training, and research in the marine sciences and a program of advisory services relating to activities in the marine sciences, to facilitate the use of the submerged lands of the Outer Continental Shelf by participants carrying out these programs, and for other purposes; to Committee on Science and Astronautics.

Rep. Keith in extension of his remarks stated that the idea of the bill is analogous to the land-grant college concept, and his belief is that such a program would create the same rapid growth in marine sciences that the land-grant college provided for agriculture. Rep. Keith stated that this bill would, among other things, meet three of the most pressing needs of our oceanographic program--applied research, dissemination of information to users, and provision of more personnel, especially ocean technicians.

The Special Subcommittee on Sea Grant Colleges of Senate Committee on Labor and Public Welfare held hearings on May 3, 1966, on S. 2439, to amend the National Science Foundation Act of 1950, as amended, so as to authorize the establishment and operation of sea grant colleges and programs by initiating and supporting programs of education, training, and research in the marine sciences and a program of advisory services, to facilitate the use of submerged lands of the Outer Continental Shelf by participants carrying out these programs, and for other purposes.

NATIONAL WATER COMMISSION ACT: Sen. Jackson in Congressional Record, Apr. 18, 1966 (p. 7837), announced that the Senate Interior and Insular Affairs Committee conducted open public hearings on May 9 and 10 on S. 3107, to create a National Water Commission. This legislation proposed by the Administration, would establish an independent, seven-member Commission of distinguished Americans outside the Federal Government who would study and advise the President and the Water Resources Council on the entire range of water problems.

OCEANOGRAPHIC AGENCY OR COUNCIL: House Apr. 19, 1966, insisted on its amendments to S. 944, to provide for expanded research and development in the marine environment of the United States, to establish a National Council on Marine Resources and Engineering Development, and a Commission on Marine Science, Engineering, and Resources; agreed to a conference with the Senate; and appointed conferees.

Conferees Apr. 28, 1966, and May 2, met in executive session to resolve the differences between the Senate- and House-passed versions of S. 944, but did not reach final agreement, and recessed subject to call.

OCEANOGRAPHY: Sen. Murphy spoke in the Senate (Congressional Record, Apr. 18, 1966, p. 7866) and called attention to the Mar. 25, 1966, dedication ceremony by the University of California's Board of Regents when it named a new oceanographic research facility on Point Loma, off San Diego, after the late Fleet Adm. Chester W. Nimitz. He stated that the 6-acre, \$1 million facility is considered to be one of the most advanced installations in the world for the study of the sea and the distribution of plant and aquatic ani-

mal life; and will be operated by the Scripps Institute of Oceanography. He further stated that this facility will be the home port for many research and training vessels, which already include the Alpha-Heliz, an ocean-going biological laboratory, and the Thomas Washington, a research vessel. The Senator inserted in the Record an article which appeared in the March 28, 1966, edition of the San Diego Union titled "Carrier for Nimitz."

Rep. Downing spoke in the House and inserted in Congressional Record, May 4, 1966 (pp. 9385-9387), a speech which was recently presented by Vice Adm. John S. McCain, Jr., U. S. Navy, representative and vice chairman, U. S. delegation, United Nations Military Staff Committee, U. S. Mission to the United Nations, at the U. S. Merchant Marine Academy at Kings Point, New York, titled "The Total Wet War." The speech emphasized the Naval aspects of the oceans, the merchant marine, oceanography, and fishing industry.

OYSTER PLANTERS LOAN: S. 3320 (Williams of N. J.) introduced in Senate May 5, 1966, to extend the benefits of the Consolidated Farmers Home Administration Act to oyster planters; to Committee on Agriculture and Forestry.

PLANNING-PROGRAMMING-BUDGETING SYSTEM: Sen. Proxmire inserted in Congressional Record, Apr. 28, 1966 (pp. 8886-8887), an article from the Apr. 28 Wall Street Journal titled "New-Look Budget?--U. S. Agencies Now Will Weigh Program Costs Against Likely Benefits--White House Further Orders Investigation of Alternative Ways To Reach Same Ends--First Reports Next Week," by Alan L. Otten. Sen. Proxmire pointed out that this new system would give the President and his agency heads a series of advantages in achieving greater efficiency and economy.

SOVIET FISHING TRAWLERS OFF THE PACIFIC COAST: Sen. Morse spoke from the floor of the Senate in a continuation of his discussion of Apr. 13, relative to the huge catches of bottomfish being taken by Soviet trawlers in the deep waters from 10 to 30 miles off the coast of Oregon. He inserted in Congressional Record, Apr. 25, 1966 (pp. 8488-8491), a letter dated Apr. 19 from the State Department, in reply to his letter of Apr. 13, requesting that the Department take immediate action, through diplomatic channels, to work out a satisfactory policy which would assure proper conservation measures with respect to the fishery resource. He also inserted in the Record the text of his letter of Apr. 25, 1966, to Donald L. McKernan, Director of the Bureau of Commercial Fisheries, U. S. Department of the Interior, requesting the Bureau to supply relevant information concerning this coastal fishery in order that all available facts will be on hand.

Rep. Wyatt inserted in Congressional Record, Apr. 27, 1966 (p. A2272), his two letters of Apr. 22, to President Johnson and Rep. Dingell, chairman of our Fisheries and Wildlife Conservation Subcommittee. Rep. Wyatt stated that Russian fishing activity off Pacific coastal areas has reached such magnitude and intensity it must be halted unless our fishery resource there is irretrievably damaged. This is more than a sectional problem--it affects our entire country.

Rep. Wyatt in extension of his remarks inserted in Congressional Record, May 2, 1966 (pp. A2343-A2344), two resolutions which were adopted on Apr. 21, 1966, by the Congress of American Fishermen concerning the

Soviet Union fishing vessels off the Oregon-Washington coasts which pose a severe threat to resources and existing fisheries of the United States. It was proposed that one of the resolutions be presented to the U. S. Senate Commerce Committee hearing on S. 2218, as an amendment to the 12-mile jurisdiction provided in that proposed legislation.

STATE DEPARTMENT--SPECIAL ASSISTANCE FOR FISHERIES AND WILDLIFE: Sen. Tower spoke in the Senate (Congressional Record, May 3, 1966, p. 9107), concerning the valuable services which are performed by the Office of the Special Assistance for Fisheries and Wildlife in the Department of State on problems which may arise between the Texas shrimp industry and that of other countries. He inserted in the Record a letter he wrote to Sen. Magnuson, Apr. 29, in support of a proposal to upgrade the status of the above-mentioned Office.

SUPPLEMENTAL APPROPRIATIONS FY 1966 (2nd): The Senate Committee on Appropriations, Apr. 25, 1966, in executive session marked up and ordered favorably reported with amendments H. R. 14012, second supplemental appropriations for fiscal year 1966. Includes additional funds for the Office of the Commissioner of Fish and Wildlife and the Bureau of Commercial Fisheries.

Under prior authority the Senate Apr. 25, 1966, reported (S. Rept. 1137) on H. R. 14012. On Apr. 27, Senate passed H. R. 14012, with amendments; insisted on its amendments; asked for a conference with House and appointed conferees.

S. Rept. 1137, The Second Supplemental Appropriation Bill, 1966: (Apr. 25, 1966, report from the Committee on Appropriations, U. S. Senate, 89th Congress, 2nd session, to accompany H. R. 14012), 40 pp., printed.

Second Supplemental Appropriation Bill, Fiscal Year 1966: Hearings before the Committee on Appropriations, United States Senate, 89th Congress, 2nd session, 635 pp., printed. Includes testimony, statements, and exhibits on additional funds for the Bureau of Commercial Fisheries and the Bureau of Sport Fisheries and Wildlife.

House May 3, 1966, disagreed to Senate amendments to H. R. 14012, making supplemental appropriations for the fiscal year June 30, 1966; agreed to a conference with the Senate; and appointed conferees.

Conferees, in executive session, May 5, 1966, agreed to file a conference report (H. Rept. 1476) on the differences between the Senate- and House-passed versions of H. R. 14012, second supplemental appropriations for fiscal year 1966. The conferees allowed (Amendment No. 15) \$148,000 for "Management and Investigations of Resources, Bureau of Commercial Fisheries," as proposed by the House instead of \$193,000 as proposed by the Senate.

The Senate May 10, 1966, adopted the conference report on H. R. 14012, making supplemental appropriations for fiscal year ending June 30, 1966; and concurred in the House amendments. This action cleared the bill for the President's signature.

WATER POLLUTION CONTROL: Subcommittee on Air and Water Pollution of Senate Committee on Public Works Apr. 20, 1966, continued its series of hearings on several pending bills proposing various amendments to the Federal water pollution control laws, having as its witnesses John W. Gardner, Secretary, and James N. Quigley, Assistant Secretary, both of the Department of HEW; and Stewart L. Udall, Secretary of the Interior.

WATER POLLUTION CONTROL ACT AMENDMENT: S. 3225 (Tydings) introduced in Senate Apr. 14, 1966, to provide that plans and regulations established pursuant to section 10 of the Federal Water Pollution Control Act for the control of water pollution shall apply to vessels (including boats) and marinas. Sen. Tydings spoke in the Senate and pointed out in Congressional Record, Apr. 14, 1966 (p. 7801), that bill would provide that the standards that the States adopt pursuant to the Water Quality Act apply to maritime pollution, as well as to the more familiar problems of municipal and industrial pollution.

WATER POLLUTION IN U. S. NAVIGABLE WATERS: H. R. 14499 (Vanik) introduced in House Apr. 19, 1966, to expand and improve existing law and to provide for the establishment of regulations for the purpose of controlling pollution from vessels and certain other sources in the Great Lakes and other navigable waters of the United States; to Committee on Merchant Marine and Fisheries.

WATER RESOURCES PROPOSALS--FEASIBILITY INVESTIGATIONS: Subcommittee on Irrigation and Reclamation of House Committee on Interior and Insular Affairs Apr. 28, 1966, held a hearing on H. R. 13419, to authorize the Secretary of the Interior to engage in feasibility investigations of certain water resource development proposals. Testimony was heard from officials of the Department of the Interior.

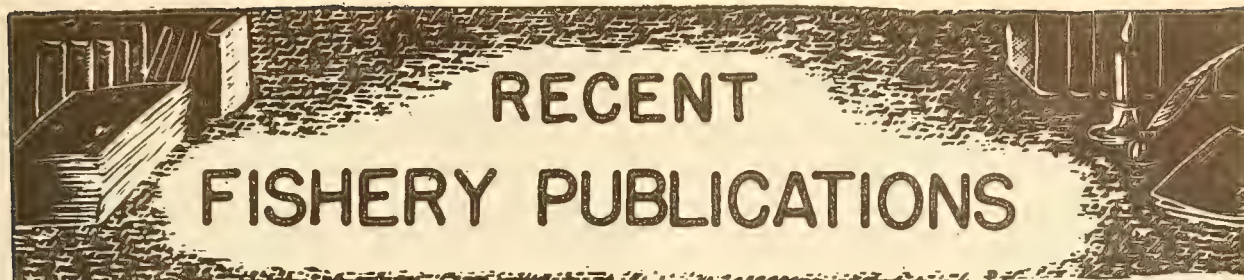
WATER RESOURCES RESEARCH: S. 22, an act to promote a more adequate program of water research was signed by the President on Apr. 19, 1966 (P. L. 89-404).

WORLD HUNGER: House Committee on Agriculture May 5, 1966, met in executive session and approved Committee Print No. 5 on H. R. 12785 (proposed Food for Freedom Act of 1966), to promote international trade in agricultural commodities to combat hunger and malnutrition and to further economic development, a clean bill to be introduced.

H. R. 14929 (Cooley), H. R. 14939 (Matsunaga), and H. R. 14945 (Springer) introduced in House May 9, 1966, to promote international trade in agricultural commodities, to combat hunger and malnutrition, to further economic development, and for other purposes; to Committee on Agriculture.

Note: REPORT ON FISHERY ACTIONS IN 89TH CONGRESS: The U. S. Department of Interior's Bureau of Commercial Fisheries has issued a leaflet on the status of most legislation of interest to commercial fisheries at the end of the 1st session of the 89th Congress. For copies of MNL--3 "Legislative Actions Affecting Commercial Fisheries, 89th Congress, 1st Session 1965," write to the Fishery Market News Service, U. S. Bureau of Commercial Fisheries, 1815 N. Fort Myer Drive, Rm. 510, Arlington, Va. 22209.





FISH AND WILDLIFE SERVICE PUBLICATIONS

THESE PROCESSED PUBLICATIONS ARE AVAILABLE FREE FROM THE OFFICE OF INFORMATION, U. S. FISH AND WILDLIFE SERVICE, WASHINGTON, D. C. 20402. TYPES OF PUBLICATIONS ARE DESIGNATED AS FOLLOWS:

CFS - CURRENT FISHERY STATISTICS OF THE UNITED STATES.
FL - FISHERY LEAFLETS.
FFL - REPRINTS OF REPORTS ON FOREIGN FISHERIES.
SEP.- SEPARATES (REPRINTS) FROM COMMERCIAL FISHERIES REVIEW.

- | Number | Title |
|----------|--|
| CFS-3985 | - Michigan, Ohio & Wisconsin Landings, October 1965, 4 pp. |
| CFS-4044 | - Gulf Coast Shrimp Data, October 1965, 19 pp. |
| CFS-4048 | - Michigan, Ohio & Wisconsin Landings, November 1965, 4 pp. |
| CFS-4066 | - Gulf Coast Shrimp Data, November 1965, 18 pp. |
| CFS-4071 | - New Jersey Landings, January 1966, 3 pp. |
| CFS-4078 | - Michigan, Ohio & Wisconsin Landings, December 1965, 4 pp. |
| CFS-4082 | - Massachusetts Landings, December 1965, 9 pp. |
| CFS-4083 | - Shrimp Landings, December 1965, 5 pp. |
| CFS-4084 | - Gulf Coast Shrimp Data, December 1965, 16 pp. |
| CFS-4085 | - New York Landings, January 1966, 4 pp. |
| CFS-4086 | - Texas Landings, January 1966, 2 pp. |
| CFS-4090 | - Alabama Landings, January 1966, 2 pp. |
| CFS-4092 | - Florida Landings, February 1966, 8 pp. |
| CFS-4094 | - Fish Meal and Oil, February 1966, 2 pp. |
| CFS-4095 | - Michigan, Ohio & Wisconsin Landings, January 1966, 3 pp. |
| CFS-4098 | - United States Fisheries, 1964 Annual Summary, 17 pp. |
| CFS-4099 | - Louisiana Landings, January 1966, 3 pp. |
| CFS-4101 | - California Landings, January 1966, 4 pp. |
| CFS-4100 | - Fisheries of the United States, 1965, by Charles H. Lyles, 81 pp., illus., Mar. 1966. This report presents detailed information on the United States catch of fish and shellfish, production of manufactured fishery commodities, foreign trade in aquatic products, and supplies of selected fishery items (domestic production plus imports). Data in the report show that the catch in 1965 amounted to 4,722 million pounds worth \$451 million ex-vessel--the highest dollar value in our history. The volume taken was 181 million pounds or 4 percent more than in 1964. The value increased \$61 million (or 16 percent), and the average price of 9.5 cents per pound was the highest ever recorded. Shrimp was |

the most valuable item taken by domestic fishermen in 1965, accounting for 18.2 percent of the total paid for all species. The amount of \$82.1 million was paid for shrimp. That was 22 percent more than for the second most valuable item--Pacific salmon. Blue crab, flounder, king crab, and lobster catches were all higher than in 1964. The pack of canned fishery products in the United States, American Samoa, and Puerto Rico was 38.3 million standard cases (1.1 billion pounds) valued at \$484.1 million to the packers. Compared with the pack in 1964, production increased by 2.6 million cases and \$47.4 million. The gain in production was mainly from a record pack of tuna, and increases in packs of Maine sardines, clam products, animal food, and shrimp. Packs of salmon, mackerel, Pacific sardines, and oysters were smaller. Production of fresh and frozen packaged fish fillets and steaks (excluding Alaska and Hawaii) was 167.5 million pounds valued at \$65.5 million. Production of industrial fishery products was valued at \$81.9 million--an increase of \$11.9 million over 1964. Marine animal scrap and meal amounted to 253,371 tons, marine animal oil 195.6 million pounds, and fish solubles 98,017 tons. Products from oyster shells and buttons from fresh-water and marine mollusk shells were valued at \$5.7 million, a decrease of \$490,000 from the previous year. Other industrial items in 1965 included agar-agar, fish feed pellets, animal feeds, Irish moss extracts and stabilizers, kelp products, fish leather, fish fins, liquid and dry fertilizer, pearl essence and novelties, colored chips, and crab shells valued at \$20.1 million. Production of fish sticks and portions was 221.1 million pounds valued at \$91.4 million.

Sep. No. 762 - The Atlantic Tuna Fisheries, 1963.

Sep. No. 763 - Pacific Hake (*Merluccius productus*) as Raw Material for a Fish Reduction Industry.

FL-586 - Commercial Flounder Giggling, by Hilton M. Floyd, 8 pp., illus., Feb. 1966. Describes a commercial method of spearing southern flounder (*Paralichthys lethostigma*), and the gear used. The essential equipment is a spear and a light.

The Fisheries of Chile, by Sidney Shapiro, Circular 234, 18 pp., illus., Nov. 1965. Trends and developments in the Chilean fisheries are discussed, with special emphasis given to the expanding fish-reduction industry. Within a few years Chile has become one of the world's largest producers and exporters of fish meal and oil. Information is also presented on other exportable products, mainly shrimp and plated lobster (langostino), and on segments of the industry that produce for domestic consumption.

The Fisheries of Japan, by Sidney Shapiro, Circular No. 233, 28 pp., illus., Nov. 1965. Trends, developments, and statistical data are presented on important aspects of Japan's worldwide fisheries. Included are discussions of the principal types of fish and other aquatic products landed by the Japanese, areas in which species are caught, size and composition of the fishing fleet, fishermen's organizations, marketing methods, the main uses to which fishery products are put, trends in international trade, and the structure of the Japanese fishing industry. Information is also presented on Government support to the fisheries and on international fishery agreements to which Japan is a party.

The Fisheries of Norway, by Sidney Shapiro, Circular 235, 22 pp., illus., Nov. 1965. This report presents trends and developments in the Norwegian fisheries, the largest in Europe, excluding those of the U. S. S. R. Since domestic consumption uses only about one-eighth of fishery landings, the Norwegian fishing industry is dependent on maintaining a large export trade. The industry has encountered difficulties because of declining landings of cod and winter herring and because of competition in foreign markets. The Norwegian Government has committed itself to a policy of supporting fishermen's incomes so that they are on a level with the general wage level of the country. Support to the industry consists of subsidies, loans, and programs to modernize vessels, processing plants, and other facilities.

Progress in 1964-65 at the Bureau of Commercial Fisheries Biological Laboratory, Honolulu, by Thomas A. Manar, Circular 243, 42 pp., illus., printed, Feb. 1966. This report deals with research results achieved by the Bureau of Commercial Fisheries Biological Laboratory in Honolulu from Jan. 1, 1964 to June 30, 1965. Described are developments in the following fields: the sensory capacities of tuna; tuna behavior; subpopulations research using genetic techniques; studies of the ecology of the skipjack tuna and the albacore tuna; biological surveys of the Indian Ocean; investigations of the oceanography of the Hawaiian Islands area and of the entire Pacific; and studies devoted to the evaluation of the use of a submarine for research in fisheries and oceanography. Publications issued or in press during the period are listed.

Shark Fishing Gear: A Historical Review, by Mary Hayes Wagner, Circular 238, 17 pp., illus., Jan. 1966. In this account the descriptions of shark fishing and gear and accessory equipment, and suggestions for fishing methods and bait, are simplified and basic. The gear used for the capture of large sharks is the primary concern of this report. Small sharks that travel in schools are easily caught in large numbers by otter trawls. The author points out that "Fishing methods must be adapted to the fishing locality. Weather and sea conditions affect the choice of the vessel and limit the kinds of gear that are practical. Other factors that determine the gear are: the nature of the bottom in the fishing area; the species and abundance of sharks available; local costs of gear and labor; and the value of the products at the point of sale. It is not possible to develop general rules for shark fishing because each situation demands trial and error in the selection of the appropriate gear and method."

THE FOLLOWING FOREIGN FISHERY LEAFLETS (FORMERLY MARKET NEWS LEAFLETS) ARE AVAILABLE FROM THE BRANCH OF FOREIGN FISHERIES, BUREAU OF COMMERCIAL FISHERIES, ROOM 8015, U. S. DEPARTMENT OF THE INTERIOR, WASHINGTON, D. C. 20240:

Number	Title
FFL- 5	Denmark's Fishing Industry, 1964, 10 pp.
FFL-18	Panama's Fisheries, 1965, 10 pp.
FFL-58	Republic of Korea Fisheries, 1964, 4 pp.

THE FOLLOWING ENGLISH TRANSLATION OF A FOREIGN LANGUAGE ARTICLE IS AVAILABLE FROM THE U. S. BUREAU OF COMMERCIAL FISHERIES, ICHTHYOLOGICAL LABORATORY, U. S. NATIONAL MUSEUM, WASHINGTON, D. C. 20560:

Taxonomic Study of the Tunas, by T. Iwai, I. Nakamura, and K. Matsubara, Translation No. 38, 73 pp., processed, 1965. (Translated from the Japanese by Chufa Tasi.) This translation is intended to be an aid to the use of the original; the figures have not been reproduced.

THE FOLLOWING PUBLICATIONS ARE AVAILABLE ONLY FROM THE SPECIFIC OFFICE MENTIONED.

California Fisheries, 1965 (Preliminary), by L. A. Keilman, 24 pp., April 1966. (Fishery Market News Service, U. S. Fish and Wildlife Service, Rm. 205, P. O. Bldg., San Pedro, Calif. 90731.) Contains a brief review of major fisheries developments during 1965. Includes statistical data for 1965 with comparisons on canners' receipts and pack of tuna, tunalike fish, Pacific and jack mackerel, and miscellaneous fishery products. Also includes data on landings and canned pack of sardines, meal and oil production; cold-storage holdings of fish and shellfish; landings of market fish and shellfish; imports of fishery products into Arizona and California Customs Districts; and California whale fisheries 1963-65.

California Fishery Market News Monthly Summary, Part I - Fishery Products Production and Market Data, March 1966, 14 pp. (Market News Service, U. S. Fish and Wildlife Service, Post Office Bldg., San Pedro, Calif. 90731.) California cannery receipts of tuna and tunalike fish and other species used for canning; pack of canned tuna, tunalike fish, mackerel, and anchovies; market fish receipts at San Pedro, Santa Monica, and Eureka areas; California and Arizona imports; canned fish and frozen shrimp prices; ex-vessel prices for cannery fish; prices for fish meal, oil, and solubles; for the month indicated.

California Fishery Market News Monthly Summary, Part II - Fishing Information, March 1966, 8 pp., illus. (U. S. Bureau of Commercial Fisheries, Biological Laboratory, P. O. Box 6121, Pt. Loma Station, San Diego, Calif. 92106.) Contains sea-surface temperatures, fishing and research information of interest to the West Coast tuna-fishing industry and marine scientists; for the month indicated.

Fishery Industrial Research, vol. 3, no. 1, Dec. 1965, 53 pp., illus., printed. (Branch of Reports, U. S. Bureau of Commercial Fisheries, 2725 Montlake Blvd., Seattle, Wash. 98102.) Contains articles on: "Occurrence of pomfret (*Brama japonica*) in the Northeastern Pacific Ocean," by Charles R. Hitz and Robert R. French; "Author index of publications and addresses-1964, Bureau of Commercial Fisheries, Branches of Economics and Technology, and the Branch of Reports, Seattle," by Helen E. Plastino and Mary S. Fukuyama; "Influence of temperature on the fatty acid pattern of muscle and organ lipids of the rain-

bow trout (*Salmo gairdneri*)," by Werner G. Knipp-rath and James F. Mead; "Costs and earnings of tropical tuna vessels based in California," by Roger E. Green and Gordon C. Broadhead; and "Amino acid composition of the alewife (*Alosa pseudoharengus*)," by Mary H. Thompson and Robert N. Farragut.

Inhibition of Unicellular Algae by Synthetic Surface-Active Agents, by Ravenna Ukeles, 9 pp., illus., printed. (Reprinted from *Journal of Phycology*, vol. 1, no. 3, 1965, pp. 102-110.) U. S. Bureau of Commercial Fisheries Biological Laboratory, Milford, Conn.

Monthly Summary of Fishery Products Production in Selected Areas of Virginia, North Carolina, and Maryland, February and March 1966, 4 pp. each. (Market News Service, U. S. Fish and Wildlife Service, P. O. Box 447, Hampton, Va. 23369.) Landings of food fish and shellfish and production of crab meat and shucked oysters for the Virginia areas of Hampton Roads, Chincoteague, Lower Northern Neck, and Lower Eastern Shore; the Maryland areas of Crisfield, Cambridge, and Ocean City; and the North Carolina areas of Atlantic, Beaufort, and Morehead City; together with cumulative and comparative data on fishery products and shrimp production; for the months indicated.

Receipts and Prices of Fresh and Frozen Fishery Products at Chicago, 1965 (Preliminary), 49 pp., April 1966. (Fishery Market News Service, U. S. Fish and Wildlife Service, Rm. 704, 610 S. Canal St., Chicago, Ill. 60607.) Contains statistical tables on receipts of fish and shellfish at Chicago wholesale market by species, states and provinces, and by months; wholesale market price ranges by months for fresh-water fish, frozen fillets, and other frozen fish and shellfish.

(Seattle) Washington and Alaska Receipts and Landings of Fishery Products for Selected Areas and Fisheries, Monthly Summary, March 1966, 7 pp. (Market News Service, U. S. Fish and Wildlife Service, 706 New Federal Office Bldg., 909 First Ave., Seattle, Wash. 98104.) Includes landings by the halibut fleet reported by the Seattle Halibut Exchange; salmon fleets reported by primary receivers; landings of halibut reported by the International Pacific Halibut Commission; landings of otter-trawl vessels; receipts reported by the Fishermen's Marketing Association of Washington; local landings by independent vessels; coastwise shipments from Alaska by scheduled and non-scheduled shipping lines and airways; imports from British Columbia via rail, motor truck, shipping lines, and ex-vessel landings; and imports from other countries through Washington customs district for the month indicated.

MISCELLANEOUS PUBLICATIONS

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM. CORRESPONDENCE REGARDING PUBLICATIONS THAT FOLLOW SHOULD BE ADDRESSED TO THE RESPECTIVE ORGANIZATION OR PUBLISHER MENTIONED. DATA ON PRICES, IF READILY AVAILABLE, ARE SHOWN.

BACTERIOLOGY:

Articles from *Chemical Abstracts*, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006:

"The marine bacteria. I - Comparative observations on the inorganic salt requirements of marine and terrestrial bacteria," by Tomio Hidaka, vol. 62, Apr. 26, 1965, Abstract No. 10863e.

"Marine bacteriology and the problem of mineralization," by Sydney C. Rittenberg, vol. 63, Aug. 2, 1965, Abstract No. 3327d.

"Phospholipids of nervous system in vertebrates and invertebrates," by E. M. Kreps and others, vol. 60, Apr. 13, 1964, Abstract No. 9652b.

BOTULISM:

Sixty-five Years of Human Botulism in the United States and Canada (Epidemiology and Tabulations of Reported Cases, 1899 Through 1964), by K. F. Meyer and B. Eddie, 76 pp., June 1965. University of California Printing Department, University of California, Berkeley, Calif. 94720.

BRAZIL:

The following publications are available from Grupo Coordenador do Desenvolvimento da Pesca (GCDP), Sudene, Cais de Santa Rita, Edif. Entrepoto Fed. Pesca, Recife, Pernambuco, Brazil:

"Glossário de nomes de peixes; português, inglês, sistemático" (Glossary of Fish Names; Portuguese, English, and Scientific), by J. M. Brandao, articles, *Boletim de Estudos de Pesca*, vol. 4, no. 4, July-August 1964, pp. 7-40; vol. 4, no. 5, September-October 1964, pp. 7-59; vol. 4, no. 6, November-December 1964, pp. 7-59; printed in Portuguese.

"A pesca em Pernambuco" (The fishery in Pernambuco), by Osiris Lira, article, *Boletim de Estudos de Pesca*, vol. 4, no. 2, March-April 1964, pp. 9-14, printed in Portuguese.

CANADA:

Annual Review, Fisheries Council of Canada, 1966, 104 pp., illus., printed, 1966. Fisheries Council of Canada, 77 Metcalfe St., Ottawa 4, Canada. This Review covers the Canadian fishing industry in great depth. It is an authoritative reference manual providing a broad picture of the fishing industry in its editorial columns. Among others, contains these articles: "Science in the service of an industry," by F. R. Hayes; "Fisheries industrial development," by J. Kinloch; "Voluntary versus mandatory inspection in the seafoods industry," by H. E. Crowther; "Modern development of the Japanese fishing industry," by Norio Fujinami; "Planning for greater food production," by David F. Corney; "Canada's sea fisheries in 1965," by A. Proulx; "Automation on trawlers," by Conrad Birkhoff.

Atlantic Salt Fish Commission Report (established by Order in Council dated Oct. 29, 1964, P. C. 1964-1672), 170 pp., illus., processed. Department of Trade and Commerce, St. John's, Newfoundland, Canada. This Report was prepared by the Atlantic Salt Fish Commission established Oct. 29, 1964, to study the Atlantic salt-fish industry and the advisability of establishing a National Salt Fish Marketing Board. The Commission concluded that the problems of the salt-fish industry were in the area of production and quality rather than in marketing. The Commission recommended: (1) that a National Salt Fish Marketing Board not be established; (2) that the manufacturing of salt fish be taken out of the hands of fishermen; (3) that a manufacturing

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agency be established for the primary purpose of salting fish; (4) that these products be offered for sale by auction or by tender to Canadian exporters; (5) that efforts of the Government to reduce the number of inshore fishermen through training and migration assistance be encouraged; (6) that more care be taken by Government in choosing the types of assistance given to primary producers; and (7) that nothing be done in accomplishing these ends that will prejudice the expansion of the freezing industry.

The Report includes chapters on: (1) The Problem and Measures Towards its Solution; (2) Historical Development of the Atlantic Coast Fishery; (3) The World Fishery; (4) Canada's Position in the World Fishery; (5) The Primary Fishing Industry; (6) the Salt Fish Processing Industry of the Atlantic Provinces and Quebec; (7) Frozen Fish or Salted Fish--Some Economic Considerations; and (8) Factors Which Inhibit Economic Development in the Fisheries. Appendices with tables are included.

British Columbia Catch Statistics, 1965 (by Area and Type of Gear), 205 pp., illus., processed, Feb. 4, 1966. Economics Branch, Department of Fisheries of Canada, 1155 Robson Street, Vancouver 5, B. C., Canada. The fifteenth annual report of catch statistics for British Columbia based on Departmental copies of sales slips that are completed by all commercial fish buyers operating within the Province. The report is divided into three sections: (1) summary of landings and landed values by district; (2) highlights of catch statistics--a general review of significant events in the salmon fishery and a review for other species; and (3) detailed district and area statistics by type of gear. Landings of halibut at U. S. ports by Canadian fishermen are included in area and summary totals.

The Canadian Fish Culturist, issue 35, Oct. 1965, 72 pp., illus., printed. Information and Consumer Service, Department of Fisheries, Ottawa, Canada. Among the articles included are: "Water Pollution and Fish Populations in the Province of Newfoundland and Labrador in 1964," by V. R. Taylor; and "Fisheries Problems Associated with Hydroelectric Development," by R. N. Gordon.

CHEMICAL COMPOSITION:

Articles from Chemical Abstracts, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006:

"Blood chemical composition of the carp and sazan," by I. D. Golovats'kii, B. S. Avdos'ev, and Z. P. Nazarkevich, vol. 59, Aug. 19, 1963, Abstract No. 4304b.

"The effect of temperature on the fatty acid composition of the crustacean plankton," by Tibor Farkas and Sandor Herodek, vol. 61, July 6, 1964, Abstract No. 1007f.

"Fatty acid composition of mackerel, shad, and sardine oils," by Antonio Montefredine and Concetta Testa, vol. 63, Aug. 2, 1965, Abstract No. 3177c.

"The lipids of flounder. I--Acetone-soluble lipids from flounder muscle," by Hisanao Igarashi and others, vol. 60, Mar. 16, 1964, Abstract No. 7190f.

"Studies on the fatty acid composition of crayfish lipids," by D. A. Wolfe, article, Journal of the American Oil Chemists Society, vol. 42, July 1965, pp. 633-637, printed. American Oil Chemists' Society, 35 E. Wacker Dr., Chicago, Ill. 60606.

CHESAPEAKE BAY:

Chesapeake Science, vol. 7, no. 1, Mar. 1966, 58 pp., illus., printed, single copy 75 cents. Natural Resources Institute, University of Maryland, Chesapeake Biological Laboratory, Solomons, Md. Includes, among others, these articles: "Osmoregulation in the adult blue crab, *Callinectes sapidus* Rathbun," by Eng-Chow Tan and W. A. Van Engel; and "Tolerances of several marine species to Co 60 irradiation," by John C. White, Jr., and Joseph W. Angelovic.

COD:

"The use of sodium dodecyl sulphate in the study of protein interactions during the storage of cod flesh at -14°," by J. J. Connell, article, Journal of the Science of Food and Agriculture, vol. 16, no. 12, December 1965, pp. 769-783, illus., printed, single issue £1 17s. 6d. (US\$5.25). Society of Chemical Industry, 14 Belgrave Square, London, S.W.1, England.

COD LIVERS:

"Free fatty acid formation in cod livers sterilized by irradiation," by R. G. Ackman, J. E. Stewart and H. E. Power, article, Journal of the Fisheries Research Board of Canada, vol. 23, no. 1, January 1966, pp. 155-156, printed, single issue C\$1.00. Issued by Fisheries Research Board of Canada, Ottawa, Ontario, Canada. (Sold by Queen's Printer, Ottawa.)

CRAB:

The Alaskan King Crab Industry, 8 pp., printed. (Reprinted from Alaska Review of Business and Economic Conditions, vol. II, no. 5, Nov. 1965.) Institute of Business, Economic and Government Research, University of Alaska, College, Alaska 99735.

"Proximate composition of Chesapeake Bay blue crab (*Callinectes sapidus*)," by Robert N. Farragut, article, Journal of Food Science, vol. 39, May-June 1965, pp. 538-544, printed. Journal of Food Science, 510-524 North Hickory St., Champaign, Ill. 61820.

FILM STRIPS:

Understanding Oceanography, consists of 6 film strips, three 33½ r.p.m. records, 6 Teacher's Guides, complete set \$42.50, each filmstrip with record guide \$9.50. (Recommended for procurement under federally funded education programs, grade level: Jr.-Sr. High.) Society of Visual Education, Inc., 1345 Diversey Parkway, Chicago, Ill. 60614. The latest information about recent developments and discoveries in oceanography (not yet included in most textbooks) is provided in this informative series of full-color filmstrips. Challenges that oceanographers face today are dramatically presented. How can oceanography unlock the secret of earth's past? How can the sea's abundance be utilized for food and natural resources for the growing world population? This series also describes various forms of marine life, ocean currents and tides, and other phenomena peculiar to the sea. The films are titled: "The study of oceans," "The ocean basins," "Characteristics of seawater," "Currents, waves, and tides," "Life of the open seas," and "Life of the sea floor and shore."

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FISH BONE DETECTOR:

"Prototype automatic fish-bone detector," by James M. Moran and others, article, Food Technology, vol. 19, May 1965, pp. 46-51, printed. Institute of Food Technologists, Suite 1350, 176 N. Adams St., Chicago, Ill. 60603.

FISHING:

Fish Catching Methods of the World, by Andres von Brandt, 215 pp., illus., printed, 1964, \$12.50. Fishing News (Books) Ltd., 110 Fleet Street, London EC4, England. Some of the chapters discuss development of fishing gear; spearing and shooting of fish; line fishing with and without hook; attracting, concentrating and frightening the fish; mechanical traps and snares; barriers; from the fish basket to the pound net; art of net making; beach and boat seines; from the rake to the mussel dredge; from the beam trawl to the otter trawl; trawl fishery in three dimensions; dip nets, lift nets and fish wheels; visible and invisible gill nets; and elements of fishing gear construction. Included is an adequate bibliography, an appendix with a classification system for gear, and an index.

--Joseph Pileggi

FISH MEAL:

"Nutritive value and analytical characteristics of new and up-to-12 years old herringmeals," by B. Laksesvela and Anna T. Aga, article, Journal of the Science of Food and Agriculture, vol. 16, no. 12, December 1965, pp. 743-749, illus., printed, single issue £1 17s. 6d. (US\$5.25). Society of Chemical Industry, 14 Belgrave Square, London, S.W.1, England.

"Two methods of evaluating fish meal proteins by chick growth," by H. R. Bird and others, article, Poultry Science, vol. 44, May 1965, pp. 865-868, printed. Poultry Science Association, Kansas State University, Manhattan, Kan. 66504.

FISH OIL:

"Decomposition of cod livers and the formation of free fatty acids in cod oil," by P. M. Jangaard and H. E. Power, article, Journal of the Fisheries Research Board of Canada, vol. 23, no. 1, January 1966, pp. 21-25, printed, single issue C\$1.00. Issued by Fisheries Research Board of Canada, Ottawa, Ontario, Canada. (Sold by Queen's Printer, Ottawa.)

"Red perch and soybean oils," by A. Fricker, article, Chemical Abstracts, vol. 61, Sept. 28, 1964, Abstract No. 8532h, printed. American Chemical Society, 1155 16th Street NW., Washington, D. C. 20006.

FOOD AND AGRICULTURE ORGANIZATION:

Indo-Pacific Fisheries Council Proceedings, 11th Session, Kuala Lumpur, Malaysia, 16-31 October 1964, Section III "Symposium on Increasing Fish Consumption through Improved Handling and Distribution," 383 pp., processed in English, 1965, US\$1. IPFC Secretariat, FAO Regional Office for Asia and the Far East, Bangkok, Thailand, 1965. (Sold by Publications Section, FAO, Via delle Terme di Caracalla, Rome, Italy.) The full proceedings of this session of the Council consists of three sections.

A total of 37 papers were contributed to the Symposium of which 27 were experience and research papers from within the Indo-Pacific Region and 10 were from outside the Region prepared by specialists on selected subjects of interest to the Region. The papers reproduced in this section have been classified into the following subject groups: "Technology and Economics of Ice Production and Use"; "Handling and Icing Fresh Fish Aboard and Onshore"; "Use of Chilled Sea Water and Sea Water Ice"; "Use of Preservatives Such as Antibiotics, Species"; "Cold Storage, Transport, Containers and Other Distribution Facilities"; "Marketing, Cooperatives"; "Inspection and Quality Control"; "Consumer Education"; and "Role of Government."

FREEZE DRYING:

"An engineer looks at the kinetics and cost of food freeze-drying," by James W. Ryan, article, Food Technology, vol. 19, Apr. 1965, pp. 49-51, printed. Institute of Food Technologists, Suite 1350, 176 N. Adams St., Chicago, Ill. 60603.

"Freeze drying of fish," by Walter Pichel, article, ASHRAE Journal, vol. 7, Oct. 1965, pp. 72-73, printed. American Society of Heating, Refrigerating and Air-Conditioning Engineers, 62 Worth St., New York, N. Y. 10013.

FREEZING:

"Packing company scores again: Starts liquid nitrogen freezing," article, Fishing Gazette, vol. 82, Apr. 1965, pp. 44-45, 49, 114-115, printed. Fishing Gazette Publishing Corp., 461 Eighth Ave., New York, N. Y. 10001.

FROZEN FISH:

"Application of antioxidants in improving the shelf life of frozen fish," by I. A. Shishkanova, N. V. Chermenko, and A. M. Kamaletdinova, article, Chemical Abstracts, vol. 63, Nov. 8, 1965, Abstract No. 13940d, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

"Protein denaturation of frozen fish. Comparison between super rapid freezing by liquid nitrogen (-196°) and air (-20°) freezing," by T. Suzuki, K. Kanna, and T. Tanaka, article, Bulletin of the Japanese Society of Scientific Fisheries, vol. 30, 1965, pp. 1022-1036, printed. Japanese Society of Scientific Fisheries, Shiba-Kaigandori 6, Minato-Ku, Tokyo, Japan.

FROZEN STORAGE:

"Growing import-export FF trade impels zero warehouse building at ports," article, Quick Frozen Foods, vol. 27, May 1965, pp. 119-120, 122, 124, printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019.

INDIA:

"Canning of seer fish," article, Indian Seafoods, vol. III, no. 2, 1965, pp. 7-8, illus., printed in English. The Marine Products Export Promotion Council, Mahatma Gandhi Road, Ernakulam-6, Kerala State, India.

IRRADIATION PRESERVATION:

Abstracts from Technical Abstracts Bulletin, Oct. 1, 1965, printed, 50 cents a copy. Clearinghouse for Federal Scientific and Technical Information, U. S. Department of Commerce, Springfield Va. 22151:

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

Development of Irradiation Sterilized Shelf-Stable Fish and Seafood Products, by R. O. Sinnhuber and H. W. Schultz, TAB65-20, Abstract No. AD-620-675, p. 23.

Development of Radiation Sterilized Fish Items for Armed Forces Feeding, by R. O. Sinnhuber, TAB 65-19, Abstract No. AD-619-446, p. 18.

"Physiological changes induced by gamma irradiation of bacteria from shrimp," by Joseph A. Liuzzo, Arthur F. Novak, and Jesse R. Ortego, article, *Journal of Food Science*, vol. 30, July-August 1965, pp. 710-713, printed. Institute of Food Technology, Suite 1350, 176 N. Adams St., Chicago, Ill. 60603.

IVORY COAST:

"Evolution de la peche maritime en Cote-d'Ivoire de 1960 a 1965" (Development of marine fisheries in Ivory Coast from 1960 to 1965), by J. M. Bessetaux, article, *La Peche Maritime*, vol. 45, no. 1056, March 1966, pp. 163-164, illus., printed in French, single issue 15 F (US\$3). Les Editions Maritimes, 190, Boulevard Haussmann, Paris, France.

JAPAN:

Ocean Fisheries (a special issue of this quarterly journal featuring Japan's advances in fishing and fishery technology), vol. 2, no. 2, April 1966, 44 pp., illus., printed, subscription \$3.00 for 1 year. Ocean Fisheries, Circulation Department, 500 Howard Street, San Francisco, Calif. 94105. This special number examines notable aspects of Japan's current advances in the fields of fisheries science, technology, economic and geographic development. The editor says: "Long a leader in pelagic fisheries, as well as those of coastal character, the Japanese nation is a builder of fisheries and fishing vessels, an innovator in the engines and machines of fishing and fish packing; and at the same time stands in front rank of those who have devised highly sophisticated electronic instruments particularly for fisheries--and have applied them on and under the sea with signal success." Some of the feature articles, all written by members of the Japanese fishing industry and by Japanese press correspondents, are: "New Fisheries Techniques, Key to Man's Full Use of Resources"; "The Fish Finder, A Factor in Japan's Fishing Success"; "Japan's Distant-Water Trawlers, Special Design for Specific Ground Proposed"; "High Seas Minced Fish, A New Product of Immense Potential"; and several other articles on tuna fishing, cost-cutting techniques in new fishing methods, including gear and vessels.

--Norman B. Wigutoff

MARINE OILS:

"Fatty acid content of vegetable oils, unusual oils, marine oils, and margarines," by J. L. Iverson, article, *Journal of the Association of Official Agricultural Chemists*, vol. 48, Oct. 1965, pp. 902-904, printed. Association of Official Agricultural Chemists, P. O. Box 540, Benjamin Franklin Station, Washington, D. C. 20004.

MARINE RESOURCES:

A Study of the Marine Resources of the Merrimack River Estuary, Monograph Series No. 1, by William

C. Jerome, Jr., and others, 93 pp., illus., printed, June 1965. Massachusetts Department of Natural Resources, Division of Marine Fisheries, 15 Ashburton Place, Boston, Mass. 02208.

MASSACHUSETTS:

Annual Earnings of Boston Fishermen in 1964, Regional Report by Paul V. Mulkern, 19 pp., processed, Feb. 1966. U. S. Department of Labor, Bureau of Labor Statistics, 18 Oliver St., Boston, Mass. 02110.

Annual Report, Fiscal Year July 1, 1964-June 30, 1965, 95 pp., illus., processed, Sept. 1, 1965. Massachusetts Department of Natural Resources, Division of Marine Fisheries, 15 Ashburton Place, Boston, Mass. 02208. Discusses accomplishments of the Division of Marine Fisheries during the year ending June 30, 1965. Covers Marine Fisheries Advisory Commission meetings, contract dragging program, lobster research and management, shellfish research and management, estuarine research program, the coastal wetlands protection program, finfish studies, statistical needs committee, and legislation affecting marine fisheries. Includes statistical tables showing data on the lobster fishery; sea crab fishery; shore, net, and pound fishery; and Massachusetts landings of fishery products. Appendices contain information on "scrubbed" lobsters, uniform minimum legal length of quahogs, lobster and edible crab licenses for non-resident citizens, and other subjects.

MENHADEN OIL:

"Hypercholesterolemic effect of menhaden oil in the presence of dietary cholesterol in swine," by Eldon G. Hill, C. L. Silbernack, and W. O. Lundberg, article, *Proceedings of the Society for Experimental Biology and Medicine*, vol. 119, June 1965, pp. 368-370, printed. Proceedings of the Society for Experimental Biology and Medicine, Managing Editor, 630 W. 168th St., New York, N. Y. 10032.

MEXICO:

"Mexican government moves to diversify shrimp-dominated seafood industry," article, *Quick Frozen Foods*, vol. 17, Apr. 1965, p. 130, printed. E. W. Williams Publications Inc., 1776 Broadway, New York, N. Y. 10019.

MICROBIOLOGY:

Applied Microbiology, vol. 14, no. 2, Mar. 1966, 302 pp., illus., printed, single copy \$3. Waverly Press, Inc., 428 E. Preston St., Baltimore, Md. 21202. Contains, among others, articles on: "Effect of different commercial agar preparations on the inhibitory activities of phenols," by J. G. Sands and E. O. Bennett; "Biochemical differentiation of the Enterobacteriaceae with the aid of lysine-iron-agar," by Jane G. Johnson and others; and "Effect of γ -irradiation on the microflora of freshwater fish. I--Microbial load, lag period, and rate of growth on yellow perch (*Perca flavescens*) filets," by N. Kazanas and others.

NETHERLANDS:

"Le navire-usine 'Van-Gogh' construit aux Pays-Bas pur la Russie" (The factorship *Van-Gogh* built in the Netherlands for the U.S.S.R.), article, *La Pêche Maritime*, vol. 45, no. 1056, March 1966, pp. 191-195, illus., printed in French, single issue 15 F (US\$3). Les Editions Maritimes, 190, Boulevard Haussmann, Paris, France.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

NEW ENGLAND:

The Economics of the New England Fishing Industry: The Role of Technological Change and Government Aid, by Frederick W. Bell, Research Report, 221 pp., illus., processed, Feb. 1966. Federal Reserve Bank of Boston, 30 Pearl St., Boston, Mass. 02110. Investigates the economic development of the New England fishing industry in the postwar period; the economic feasibility of stern trawling to provide data for its possible adoption; and the impact of the 1964 Fishing Fleet Improvement Act on financing technological change.

OCEANOGRAPHY:

The Distribution and Characteristics of Surface Bioluminescence in the Oceans, TR-184 by Robert F. Staples, 54 pp., processed, Mar. 1966, 90 cents. U. S. Naval Oceanographic Office, Washington, D. C. 20390.

Oceanography, edited by Mary Sears, 665 pp., illus., printed, 1961, \$14.75. American Association for Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

"USSR Charts Pacific," by S. Osokin, article, Geo-Marine Technology, vol. 2, no. 3, Mar. 1966, pp. 22-24, illus., printed. INTEL, Inc., 1075 National Press Bldg., Washington, D. C. 20004. Soviet scientists have published an atlas, Relief of the Pacific Ocean Bed, which is an encyclopedia of the structure of the world's largest ocean, the Pacific Ocean. The atlas sums up and rationalizes the last 100 years of oceanographic and hydrographic research of that area.

PORTUGAL:

"Consumo Mundial de las Conservas de Pescado Portuguesas" (World Consumption of Portuguese Canned Fish), article, Boletín de Información, no. 86, Nov. 1965, pp. 8-9, printed in Spanish. Sindicato Nacional de la Pesca, Paseo del Prado, 18-20, Madrid, Spain.

"A Exportacao Galega de Conservas de Peixe em 1964" (Galician Exports of Canned Fish, 1964), article, Conservas de Peixe, vol. 20, no. 235, Oct. 1965, pp. 15-19, 28, printed in Portuguese. Sociedade da Revista Conservas de Peixe, Lda. Requeirados Anjos, 68, Lisbon, Portugal.

PROCESSING:

"New shellfish processing plant features: Space, light, comfort," article, Pacific Fisherman, vol. 63, July 1965, pp. 11-12, printed. Pacific Fisherman, Editorial Office, 71 Columbia St., Seattle, Wash. 98104.

PROTEIN:

"Characterization of a collagen from cod fish skin containing three chromatographically different α chains," by Karl A. Piez, article, Biochemistry, vol. 4, Dec. 1965, pp. 2590-2596, printed. American Chemical Society, 1155 16th St., NW., Washington, D. C. 20036.

PUERTO RICO:

Taxonomía, ecología y valor nutrimental de algas marinas de Puerto Rico (Taxonomy, ecology, and

nutritional value of marine algae of Puerto Rico: agar-yielding algae), by M. Diaz-Piferrer and Celeste Caballer de Perez, 145 pp., printed in Spanish, August 1964. Administracion de Fomento Economico, Laboratorio de Investigaciones Industriales Hato Rey, Puerto Rico and Colegio de Agricultura y Artes Mecanicas, Universidad, Mayaguez, Puerto Rico.

RADIATION:

Articles from Chemical Abstracts, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006:

"Changes in the composition of fatty acids of fish fat due to radiation," by A. A. Fomin, vol. 61, Oct. 26, 1964, Abstract No. 11241b.

"The effects of a few radioactive substances on oxygen consumption of shellfish," by Jutoku Hasegawa, vol. 62, Feb. 1, 1965, Abstract No. 3129e.

RED TIDE:

The Red Tide, by John Torpey and Robert M. Ingle, Educational Series No. 1, 27 pp., illus., printed, 1966. Florida Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla.

REFRIGERATION:

"Analyze major problem in use of air curtains," article, Frosted Food Field, vol. 38, Mar.-Apr. 1965, p. 8, printed. Frosted Food Field, 321 Broadway, New York, N. Y. 10007.

SALMON:

"Protein variations in Atlantic salmon (*Salmo salar*)," by L. Nyman, article, Chemical Abstracts, vol. 63, Oct. 11, 1965, Abstract No. 10357f, printed. American Chemical Society, 1155 16th St. NW., Washington, D. C. 20006.

SEAGRASS:

Preliminary Study of Seagrass as a Potential Source of Fertilizer, by Jack F. van Breedveld, Special Scientific Report No. 9, 26 pp., illus., processed, Jan. 1966. Florida State Board of Conservation Marine Laboratory, Maritime Base, Bayboro Harbor, St. Petersburg, Fla.

SEA NETTLES:

"A new attack on sea nettles," by Edison T. Blair, article, The Maryland Conservationist, vol. XLIII, no. 1, Jan.-Feb. 1966, pp. 16-22, illus., printed, single copy 25 cents. The Maryland Conservationist, State Office Bldg., P. O. Box 231, Annapolis, Md. 21404.

SHARK:

"Blåhaien, *Prionace glauca* (Linnaeus), 1758" (The blue shark), by Olav Aasen, article, Fiskets Gang, vol. 8, February 24, 1966, p. 142, illus., printed in Norwegian. Fiskeridirektoratet, Rådstuplass 10, Bergen, Norway.

SHRIMP:

"Program for Gulf would study shrimp landings fluctuations," article, Fishing Gazette, vol. 82, June 1965, pp. 50-51, 73, printed. Fishing Gazette Publishing Corp., 461 Eighth Ave., New York, N. Y. 10001.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

"The refractive index of the muscle of fish and shellfish. II. Measurement of changes in the muscle of cold-stored prawns, *Nephrops norvegicus*," by M. K. Elerian, article, *Journal of the Science of Food and Agriculture*, vol. 16, no. 12, December 1965, pp. 738-742, illus., printed, single issue £1 17s. 6d. (US\$5.25). Society of Chemical Industry, 14 Belgrave Square, London, S.W.1, England.

"Salt transport organelle in *Artemia salinis* (brine shrimp)," article, *Science*, vol. 151, no. 3709, Jan. 1966, pp. 470-471, illus., printed, single copy 35 cents. American Association for Advancement of Science, 1515 Massachusetts Ave. NW., Washington, D. C. 20005.

SOUTH AFRICA REPUBLIC:

Fisheries Development Corporation of South Africa Limited, Annual Report (Covering Period 1st October, 1964 to 30th September, 1965), 16 pp., printed in Afrikaans and English; March 16, 1965. Fisheries Development Corporation of South Africa Ltd., Seafare House, 68 Orange St., Cape Town, Republic of South Africa. An annual review of the corporation's financial condition and activities, including summaries of the state of the inshore fisheries for anchovy and pilchards; production of fish meal and oil, canned fish, cooked and live spiny lobsters, frozen lobster tails, and frozen whole lobsters; and activities of the corporation in anchovy, shrimp, tuna, whale, and oyster investigations, construction and maintenance of fishing harbors, and related areas of interest.

SPAIN:

Articles from *Industria Conservera*, vol. 31, no. 317, Nov. 1965, illus., printed in Spanish. Union de Fabricantes de Conservas de Galicia, Calle Marques de Valladares, 41, Vigo, Spain:

"Tecnica Conservera--Conservas de Sardina, Bonito y Anchoa" (Canning Method--Canned Sardines, Bonito, and Anchovy), pp. 306-308.

"El Mercado Aleman de Productos de la Pesca" (The German Market for Fishery Products), pp. 312-313.

Articles from *Industrias Pesqueras*, printed in Spanish. Industrias Pesqueras, Policarpo Sanz, 21-2º, Vigo, Spain:

"El Mercado Espanol del Pescado" (The Market for Fish in Spain), vol. XXXIX, no. 925, Nov. 1965, pp. 496-497, illus., printed.

"La produccion pesquera de Vigo en 1965" (Vigo's Fishery Production, 1965), vol. XL, no. 930, January 15, 1966, pp. 608-609, illus., printed.

SPAIN & PORTUGAL:

"Coup d'oeil sur la pêche espagnole et portugaise" (A look at the Spanish and Portuguese fisheries), by Peter Brady, article, *La Pêche Maritime*, vol. 45, no. 1056, March 1966, pp. 171-177, illus., printed in French, single issue 15 F (US\$3). Les Editions Maritimes, 190, Boulevard Haussmann, Paris, France.

SPINY LOBSTER:

"Methods of holding crayfish at sea," by L. A. Randall, article, *Australian Fisheries Newsletter*, vol.

25, no. 4, April 1966, pp. 19, 23, illus., printed. Fisheries Branch, Department of Primary Industry, Canberra, A.C.T., Australia.

SWEDEN:

Articles from *Svenska Vastkustfiskaren*, printed in Swedish. George Åberg, Fiskhamnen, Goteborg V, Sweden:

"Utsikterna för fisket under 1966-1970" (Outlook for the fisheries in 1966-1970), by Ingemar Gerhard, vol. 36, no. 3, February 10, 1966, pp. 52-53.

"Fangsterna minskade - pengarna ökade i svenskt havsfiske år 1965" (Volume of the catch decreases--value increases in Swedish sea fishery, 1965), vol. 36, no. 5, March 10, 1966, pp. 100-101.

SWITZERLAND:

"The Swiss market for selected seafoods," article, *Indian Seafoods*, vol. III, no. 2, 1965, pp. 11, 14-16, printed in English. The Marine Products Export Promotion Council, Mahatma Gandhi Road, Ernakulam-6, Kerala State, India.

TAIWAN:

"Further Development of Fisheries in Taiwan," K. T. Li, article, *Industry of Free China*, vol. XXV, no. 3, March 1966, pp. 18-25, printed in English, single issue NT\$20.00. Industry of Free China, 118 Huai Ning Street, Taipei, Taiwan.

TRANSPORTATION:

"How expensive is it to operate a nitrogen FF (frozen food) delivery fleet?" by Arthur Gaudio, article, *Quick Frozen Foods*, vol. 17, Apr. 1965, pp. 161, 166, printed. E. W. Williams Publications, Inc., 1776 Broadway, New York, N. Y. 10019.

TRAWLING:

"Underwater observations on fish in an off-bottom trawl," by William L. High and Larry D. Lusz, article, *Journal of the Fisheries Research Board of Canada*, vol. 23, no. 1, January 1966, pp. 153-154, illus., printed, single issue C\$1.00. Issued by Fisheries Research Board of Canada, Ottawa, Ontario, Canada. (Sold by Queen's Printer, Ottawa.)

TUNA:

"Dati sulla pesca all'amo del tonno nello stretto di Messina" (Observations on the catching of tuna with hook and line in the straits of Messina), by Sebastiano Genovese, article, *Bollettino di Pesca, Piscicoltura e Idrobiologia*, vol. XX, no. 1, January-June 1965, pp. 41-51, illus., printed in Italian with English and French summaries. Laboratorio Centrale di Idrobiologia, Piazza Borghese 91, Rome, Italy.

TURKEY:

Balık ve Balıkçılık, vol. 14, no. 1, Jan. 1966, 32 pp. illus., printed in Turkish. Et ve Balık Kurumu G. M., Balıkçılık Müdürlüğü, Besiktas, Istanbul, Turkey. Among the articles included are "Seminar on fisheries economics in Turkey," and "Britain's present fisheries."

"1963-67 birinci bes yıllık kalkinma plani 1966 yili programi ve balikçilik" (The fisheries in 1966 program of the first five years development plan, 1963-1967, of Turkey), article, *Balık ve Balıkçılık*, vol.

THESE PUBLICATIONS ARE NOT AVAILABLE FROM THE FISH AND WILDLIFE SERVICE, BUT USUALLY MAY BE OBTAINED FROM THE ORGANIZATION ISSUING THEM.

XIV, no. 2, February 1966, pp. 1-3, printed in Turkish. Et ve Balık Kurumu G. M., Balıkçılık Müdür-lüğü, Besiktas, Istanbul, Turkey.

UNITED KINGDOM:

New Era in Fishing (A Technical Review), Supplement to Fishing News, March 4, 1966, 40 pp., illus., printed. Fishing News, 110 Fleet Street, London, E.C. 4, England. Technical change in British fishing is the theme of this Supplement. Included are articles on the following subjects: freezer-trawler operation; what's new in trawling; changes in in-shore vessels; making the sea safer; British trawler development; diesel engines for inshore craft; lubrication of trawler machinery; winches and deck gear; communications and fish-finding equipment; floats and bobbins; synthetic fibers for fishing; and plastics in the fishing industry.

Warp Load Meters for Seine Net Vessels, Research Development Bulletin, no. 17, 4 pp., illus., processed, Dec. 1965. White Fish Authority, 2/3 Cursitor Street, London, E.C. 4, England.

U. S. S. R.:

Articles from Okeanologiya, vol. 6, no. 1, 1966, printed in Russian, single issue 1 ruble & 50 kopeks (about US\$1.65). Okeanograficheskaya, Komissiya, Akademia Nauk U. S. S. R., Moscow:

"A plankton net with a water-measuring arrangement. Its description and test results," by E. P. Bitiukov, pp. 165-171, illus.

"37th cruise of Vitjaz in the central part of the Pacific Ocean," by V. P. Petelin, pp. 172-175, illus.

"The most recent foreign oceanographic research vessels," by V. L. Tsurikov, pp. 176-185, illus.

YEARBOOK:

The following yearbooks are for sale by the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402:

The Population Challenge--What It Means to America, U. S. Department of the Interior Conservation Yearbook No. 2, 80 pp., illus., printed, 1966, \$1.25. U. S. Department of the Interior, Washington, D. C. Examines the problem of how the population explosion will affect one's life and the crucial decisions one must make to ascertain a livable environment in the years to come. Discusses among others, the problems of commercial fisheries in the United States today, and how the Bureau of Commercial Fisheries has been helping to solve them.

Quest for Quality, U. S. Department of Interior Conservation Yearbook No. 1, 96 pp., illus., printed, 1965, \$1.00. U. S. Department of the Interior, Washington, D. C. Among other things, discusses the Bureau of Commercial Fisheries' vast research program that spans continents and plumbs the depths of our greatest oceans. Special mention is made of the research to provide fish protein concentrate (known as FPC) to more than 2 billion people who do not receive enough protein to maintain a minimum balanced diet.



Editorial Assistants: Ruth V. Keefe and Jean Zalevsky

Compositors: Alma Greene, Mary Andrews, and Mary Donaldson

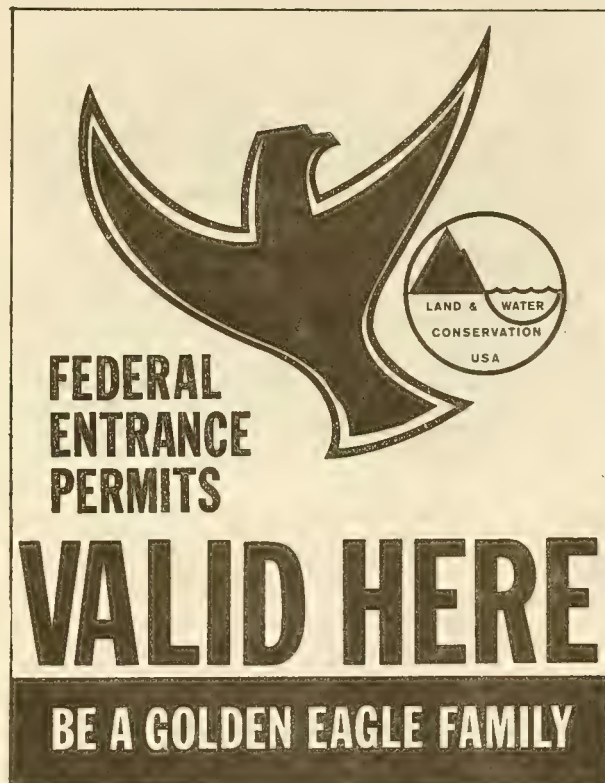
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Photograph Credits: Page by page, the following list gives the source or photographer for each photograph in this issue. Photographs on pages not mentioned were obtained from the Service's file and the photographers are unknown.

P. 22--Edward Gruger; p. 32--Alaska Dept. of Fish and Game; p. 35 (fig. 1)--H. R. Bullis, Jr. p. 49--Consulate General of Japan, N.Y. p. 55--Info. Services, Dept. of Fisheries, Ottawa, Canada; pp. 63 & 64--A. W. Anderson, Regional Fisheries Attache for Europe, U.S. Embassy, Copenhagen, Denmark; p. 74--Peter Brady, Fleetwood, England; p. 75--R. S. Croker; p. 85--S. Springer; p. 87--Office of Information, Commission on Rural Construction, Taiwan; p. 91--Bummeister & Wain, Denmark; p. 96 (fig. 2)--Charles L. Philbrook; pp. 97 & 98 (fig. 8)--R. C. Naab; p. 98 (fig. 5)--W. Haskell; p. 99 (fig. 10)--U. S. Coast Guard.

NEW \$7 FEDERAL "GOLDEN PASSPORT" ON SALE ACROSS THE NATION

The new \$7 Federal Recreation Permit--the "Golden Passport" of the Federal Government's Operation Golden Eagle--went on sale across the Nation March 25, 1966, announced the U. S. Department of the Interior. The wallet-size card was designated a "Golden Passport" because of its gold color and the large number of Federal recreation areas--7,000 of them--it entitles the purchaser and everyone in his car to enter.



Designates 7,000 areas where the \$7 Federal Recreation Permit--the "Golden Passport"--is valid.

use it on a commercial bus going into an area or when walking into an area or building. The 1966 permit is valid an unlimited number of times from April 1 through March 31, 1967. It does not cover special user charges, such as fees for guides, elevators, etc.

The annual permit is sold at national parks and monuments, national forest areas, wild-life refuges, Corps of Engineers recreation areas, and other Federal recreation areas that charge entrance fees. It also will be on sale in many cities at offices of the American Automobile Association, the Forest Service, National Park Service, Tennessee Valley Authority, Bureau of Sport Fisheries and Wildlife, and the Bureau of Outdoor Recreation.

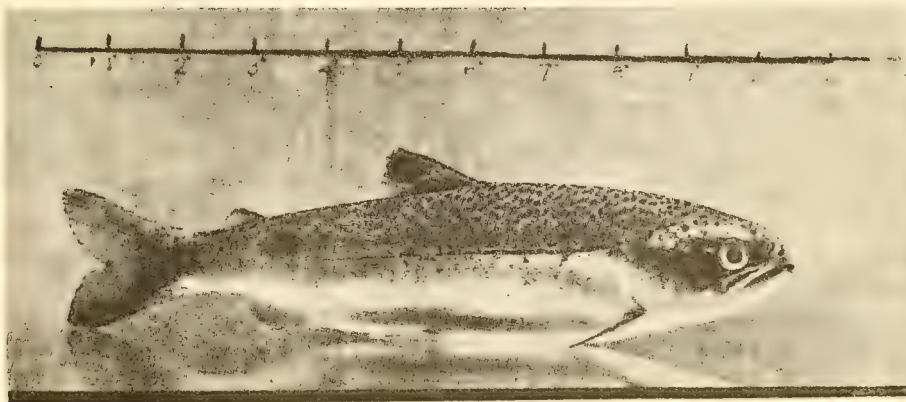
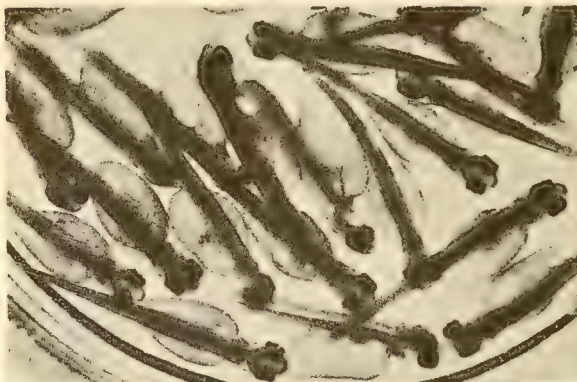
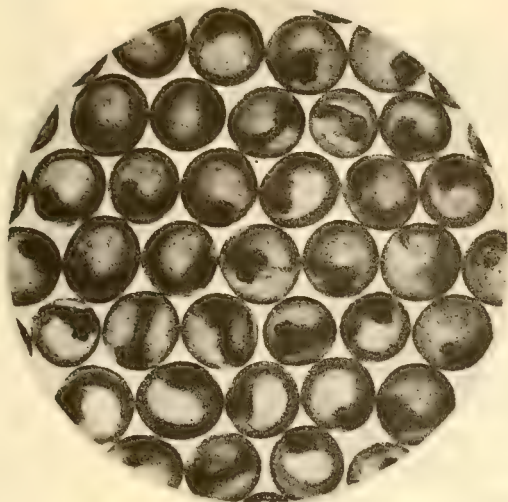
Secretary of the Interior Stewart L. Udall recommended wide citizen support for all phases of Operation Golden Eagle, but especially urged purchases of the \$7 "Golden Passport" to help provide support for the Land and Water Conservation Fund. "How much of the national outdoor heritage we save for future generations is largely dependent on how we today employ the skills and energy at our disposal. Congress wisely provided the means of saving much of what remains through passage of the Land and Water Conservation Fund Act," Secretary Udall stated.

The program to expand revenues of the Fund has attracted wide citizen support. Operation Golden Eagle was devised to provide a rallying point for marshalling support of the program in all the States and territories. Money from the sale of the "Golden Passport," together with other fees and revenues, goes into the Fund. Appropriations from the Fund assist States and their local governments in meeting urgent outdoor recreation needs and in the acquisition of Federal areas authorized by Congress.

Besides admitting a carload of people to Federal recreation areas, the \$7 "Golden Passport" will admit the purchaser himself, regardless of how he travels, to all Federal recreation areas that charge entrance fees. This means that the owner of the permit can

WEST COAST SALMON GROW UP IN MICHIGAN

Coho salmon have now been Michigan residents for one full year, and they are well on their way to a long sojourn in that State. The picture at left shows them as "eyed" eggs, when they arrived from Oregon in January 1966. A second batch arrived from the State of Washington in February 1966. Soon after being placed in rearing pens at Harrietta and Oden hatcheries, they changed to the "sac-fry" size with the egg sacs still attached, as



shown at right. Above, one of the fish as seen in February 1966, after a year in the hatchery, is about 10 inches long. First releases of the fish will be made in the spring of 1966 in the Platte River, Benzie County; in Bear Creek of Manistee County; and in Huron River, Baraga County. (Michigan Conservation, January-February 1966.)

HAWAII CALLS: ONO ONO MAHIMAHI

In October 1868, a mythical ship, Lucy S., arrived in Hawaii. On this mythical voyage, Lucy, the Captain's wife, an avid recipe collector, wrote a series of mythical letters to her cousin, Sarah, who remained in New Bedford. From these letters, the United States Department of the Interior's Bureau of Commercial Fisheries has announced a new collection of kitchen-tested recipes for today's busy homemaker.

Bring the exciting tang and exotic charm of the Hawaiian Islands to your table with Ono Ono Mahimahi (Delicious Dolphin).



Natives greet the whaler at Hawaii.

Dolphin (not to be confused with the playful porpoises), is a deep-sea adventurer with scales of changeable rainbow colors. It sprints through the water at nearly 50 miles an hour, leaving most fish behind. This warm-water favorite will go just as fast on your table too, because dolphin is flavorful and fanciful.

In this recipe it is broiled with a simple sauce of butter and lemon juice. When golden and flaky the fish is served with a subtle sauce featuring Macadamia nuts from Hawaii. Serve it often--you'll win a wave of compliments.

ONO ONO MAHIMAHI
(Delicious Dolphin)

2 pounds mahimahi fillets or other
fish fillets, fresh or frozen
1 teaspoon salt
Dash pepper

$\frac{1}{4}$ cup butter or margarine, melted
2 tablespoons lemon juice
Macadamia Nut Sauce

Thaw frozen fillets. Skin fillets and cut into serving-size portions. Sprinkle with salt and pepper. Combine butter and lemon juice. Place fish on a well-greased broiler pan and brush with sauce. Broil about 3 inches from source of heat for 4 to 5 minutes. Turn carefully and brush with sauce. Broil 4 to 5 minutes longer or until fish flakes easily when tested with a fork. Place fish on a warm serving platter. Pour Macadamia Nut Sauce over fish. Serves 6.

Macadamia Nut Sauce

1 cup Macadamia nuts, coarsely chopped
 $\frac{1}{2}$ cup butter or margarine, melted

1 tablespoon chopped parsley

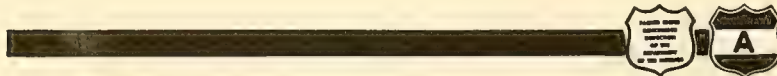
Brown nuts in butter. Add parsley. Makes 1 cup sauce.



QUALITY BY CHOICE

Mrs. American Homemaker is selective when it concerns quality in food. She knows that fish and shellfish are one of the best foods available where good eating and high quality protein, mineral, and vitamin content are concerned. She chooses products which carry the United States Department of the Interior (USDI) Inspection Shield when she wants high quality frozen fish and shellfish.

The U.S.D.I. inspection is voluntary and is offered to industry on a fee-for-service basis. Only those fishery products that have been processed under continuous in-plant inspection and which meet definite quality, processing, and packaging requirements are permitted to carry this emblem and use the prefix "U. S." with a grade designation (such as U. S. Grade A) or the familiar U.S.D.I. shield.







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